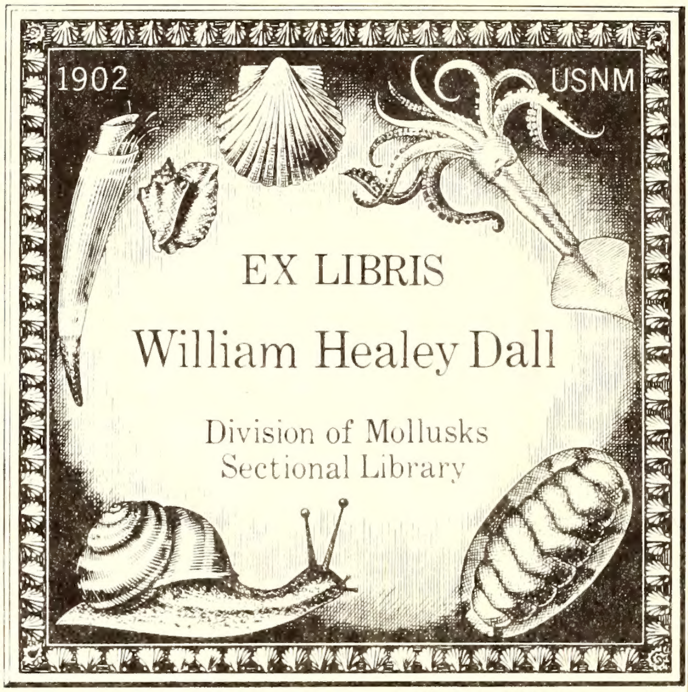

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MINUTES 96
JAN. 1950

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CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA

Subscription $2.50 per year

We are now meeting the first Tuesday of every month at 7:30 P.M. at the Los Angeles Museum, Exposition Park, Los Angeles, Calif. All interested persons are cordially invited.

Please mail all news to your editor,

John Q. Burch,
1584 W. Vernon Ave.,
Los Angeles 37, Calif,
Telephone Ax 3-5710
Home telephone Ax 2-7965

****

THE SOCIETY OF THE LOST OPERCULUM

Have you ever noticed that when you go to the shell club meeting with a large specimen to show, someone always comes up claiming a larger one at home ? So to settle some of the arguments as to who has the largest shell, we are starting a competition. No slogans to write, no box tops to send, just measurements.

In other words we are after the Paul Bunyon of each species represented on the West Coast from Alaska to Panama. To interest everybody, we are including land, fresh water and fossil shells, as well as the marine varieties.

Judging from some of the stories we hear, the measurements are made on the scales used by fishermen telling about the one that got away, or on a scale with more than 25.4 mm to the inch,

(con.)

The rules are as follows:

1. Gastropods: Measure what you have left of the shell. No fair guessing how high the shell would have been if the nucleus or the canal was still on it. Give length and diameter.
2. Pelecypods: give length and height. No more than 25.4 mm to the inch, nor more than 12 inches to the foot.
3. Give locality where found.
4. Indicate whether fossil, by giving age.
5. Give latest nomenclature please.

Each one sending in a list will get a handsome (?) " hand engraved" certificate of membership in the " SOCIETY OF THE LOST OPERCULUM".

Now follows a list of the first entries. Have you got something bigger and better ? What about your other species ? Send your list to Dick Mayhew, 1648 S. Genesee St., Los Angeles 55, Calif.

Submitted by Geo. P. Kanakoff:	Length
Turbonilla regina Dall and Bartsch, Catalina	16 mm
Megathura crenulata Sowerby, San Pedro Breakwater	124 mm
Massyla crawfordiana Dall, Lower Pleist., San Pedro	52mm
Bursa californica Hinds, Playa del Rey	149 mm
Fusitriton oregonensis Redfield, Seattle	122 mm
Boreotrophon stuarti Smith, Craig, Alaska	56 mm
" multicostatus Esch, Edison Bldg., Pliocene	45 mm
Aforia circinata Dall, Afognak Island, Alaska	56 mm
Plicifusus kroyeri Moller, Gulf of Peter the Great	66 mm
Los Angeles Museum	
Pterynotus leeanus Dall, Playa del Rey, Pleistocene	62 mm
Megasurcula carpenteriana Gabb, " "	89 mm
Cyathodonta undulata Conrad, Newport, Pleistocene	136 mm
Dick Mayhew	
Cancellaria tritonidea Gabb, San Pedro Lumber Co., Pleist.	78 mm
Burchia redondoensis T.A. Burch, Cabrillo Beach	50 mm
Cancellaria cooperi Gabb, "	82 mm
John Burch	
Polinices lewisii Gould, Newport, Calif.	140 mm
Chlamys hericius (Gould), Strait of Juan de Fuca (Ht.)	74 mm
Laevicardium elatum Sowerby, La Paz, Lower Calif.	140 mm
Astraea inaequalis Martyn, Monterey Width 37	Height 30 mm
Lottia gigantea Gray, South Coronado Island	86 mm

Seriously though, if readers of the Minutes enter into this competition, we should be able to compile a valuable list of sizes that heretofore have not been available to everyone.

This list will be a regular feature in the Minutes AS LONG AS YOU CONTRIBUTE. If your entries do not get published immediately it will be due to the bookkeeping necessary to keep an accurate record. All entries will be acknowledged, so please be sure your name and return address are legible.

* * *

Mr. E.P. Baker cut his hand rather seriously on a power tool and was in the hospital for surgery on it, but we understand is now out and recovering nicely. We hope so.

When Earth's last paper is written,
And the ink of the scribes is all dried,
And the quarrels are all but forgotten,
And the youngest critic has died,
We shall rest, and, faith, we shall heed it;
Lay off for an aeon or two,
To repose our fatigued cerebellums
Ere we tackle old Bulla anew.
Then the Vesica lads will be shouting
To approve their debatable claim.
And Rafinesque's ghost will be wailing
To revive his Bullaria name.
The Bullus fans glare at Bullea,
While Linnaeus gets madder and madder;
So lets scrap the whole gang; let the Latin go hang
And compromise firmly on BLADDER.

(Apologies to Rudyard Kipking, Myra Keen,
Harald Rehder and others)

For John Burch, from Henry Dodge

****

Mr. A.S. Koto and Miss Adele Koto, Marathon, Florida. " On our way down here we stopped at Bradenton Beach for a few days. A very good friend of ours there, Mr. L.K. Stan, came over to the trailer as soon as he saw it, and told us to come over that he had a sight that would open our eyes. He had a large number of Spondylus which he had bought from the sponge divers. They had been out several times before but didn't find any, but this trip they really made a hawl, and Mr. Stan bought the whole bunch from them. He is going to sell them at $20 and some for $10. ..."

******

Dr. Pilsbry, just after celebration of his 87th birthday last month, left, via airplane down the west coast of South America, to visit his daughters and son-in-law. He hopes to get in some collecting, working out from Buenos Aires,Argentina. His permanent address remains unchanged.

Ruth E. Coats, Tillamook, Oregon. We are happy to hear that Ruth and her mother will both be with us at Santa Barbara in April. We also expect to have the Spicers and Walter Eyerdam from the north with us. And we hope many others to make our Santa Barbara meeting a definite success.

For the " Minutes" I am submitting a little poem about " Sebastian" the snail, which I found in an old edition of Puck in Harbin, Manchuria in 1928. The author is unknown. Walter J. Eyerdam.

SEBASTIAN

I have long sought- how often have I sought him,
The sturdy robber in his coat of mail;
And now this thunderous nightfall I have caught him,
Sebastian the Snail.

Yes, here I hold him fast, my ancient foeman,
Of portly presence, stout and round and strong;
Like Falstaff, shamming dead, Sebastian ? No man
Shall save thy life for long.

Bring me the brine-pot, I will see him drinking
The deadly draught; Sebastian shall die.
And yet- what memories have set me thinking
And rather wondering why ?

Who knows what cruel wrong has been inflicted,
What ills have rankled in that horrid head,
What dream of haunts from which he was evicted,
What kindred loved and dead ?

'Twas here I found two snails one morning sitting
Upon one tulip leaf. My wrath arose,
And I so dealt with them as I saw fitting.
His wife, his child -- who knows ?

Be that as may be, there is this about him,
He has provided sport for many hours,
And this bed here will be quite dull without him,
Though it be decked with flowers.

Pursued by me, fair game for every starling,
He still escaped, a snail of many wiles,
Ulysses-like, Autolycus's darling,
To eat my plants in piles.

He ate schizanthus, and I sought at night time,
At nine o'clock; he got to work at ten.
I went at ten, but that was not the right time;
He chose eleven then.

I tried eleven, for my annual phlox were
Nibbled away as level as a lawn;
He sought the spot where my most cherished stocks were
And breakfasted at dawn

When he attacked my antirrhinums (twenty
Fell between even and the break of day)
And I laid poison thick and slab and plenty,
He went another way.

Knowing each trick, each trap for the unwary,
Skilled to anticipate and to detect,
Cautious and scheming, calculating, chary,
He won my deep respect.

A gallant fellow; no, I will not slay thee,
  Sebastian, but thou needs must change abode;
Hence to the Elba where I gently lay thee,
  The ditch across the road.

Farewell. If in requital of my mercy
  Thou walk'st back here, rapacious,round and fat,
I shall not know thee. I shall call thee Percy;
  And Percies I squash flat.

****

PUBLICATIONS RECEIVED

Fish Bulletin No. 74- State of California Dept. of Fish and Game- This bulletin includes a historical review 1916-1947. A few notes from this interesting report in 267 pages should be noted.

" Between 1850 and 1900 abalones were gathered in such quantities by the Chinese that restrictions were imposed to curb the over-exploitation. The Chinese dried the abalones and shipped them to China. They also exported the shells to that country. In the seventies there was such a demand for curios and jewelry made of abalone shell that the shell was worth twice as much as the meat. There is little demand at present, for abalone shell jewelry. Having decimated the beaches of abalone and being curbed by legal restrictions, the Chinese were practically eliminated from the fishery. The Japanese then introduced the diving suit and moved into deeper water. They controlled the fishery until about 1930 when a number of Caucasians began diving at Morro Bay. At the beginning of World War II, in 1941, there were about equal numbers of white and Japanese crews. During the war the Japanese were not allowed to operate, and none of them have so far gone back into the industry.

The Japanese received $1 a dozen for their abalones and the price had been increased to $2.50 by 1941. The present price to the diver is about $6 a dozen for the red and $5 for the green abalone.

Clams- The coastline of California is deficient in bay and estuary areas and the ocean beaches are also of limited extent/ The clam population is correspondingly scarce. ... The clams which can still be obtained in limited quantities are: Bean(Donax gouldii); Cockle(Paphia staminea, Chione sp.); Gaper (Schizothaerus nuttalli); Jackknife (Tagelus californianus); Razor (Siliqua patula); Softshell (Mya arenaria); Washington(Saxidomus nuttalli).

The softshell clam is not a native species. It was accidentally introduced from the east coast of the United States...Productive beds can be maintained by the simple expedient of surrounding an area of mud flat with a stake fence to exclude stingrays, who effectively curtail the clam population...."

Pismo Clam- The Pismo Clam, Tivela stultorum Mawe - Mr. Aplin mentions that " The clams can usually be aged by counting growth rings on the shell. " The Pismo Clam is highly protected now and is comparatively scarce in California being found in any quantity only near Pismo Beach. However, the account of the clam in Mexico is of interest. " There are many beaches along the coast of Lower California where Pismo clams are plentiful. Here a man can gather and shuck enough clams at one low tide to produce from one to two hundred pounds of meats. However, a number of factors have made it impractical to continue the canning

of Mexican Pismo clams. Although the cost of digging the clams was quite low, the expense of getting them to the cannery was considerable. Carrying the cans of clam meats through the surf to a vessel anchored offshore was both difficult and dangerous. Shipment by truck was also unsatisfactory due to poor roads...." Othe difficulties were also encountered such as lack of refrigeration and the necessity of shucking without proper facilities.
Oysters- The reason for the lack of a commercial growing of the native *Ostrea lurida* which seems to be abundant enough the length of the coast is interesting. " The ocean and bay waters of our coast do not attain a sufficiently low temperature in the fall to cause the oysters to " harden up". The natives, Olympias, on the local markets are shipped in from Olympia, Wash."
Ostrea virginica- The first of the eastern oysters brought in about 1870 were full grown shell stock and were planted in San Francisco Bay. They flourished until about 1900 being a million dollar a year business. But the increasing population and industrial expansion ended this in San Francisco Bay. Later some were grown in Tomales Bay, and one is still used there as a holding bed for adult oysters shipped in by the car load.
Ostrea gigas- (or O. laperousii ?) . Extensive beds of this species grown from seed imported from Japan flourished in the Puget Sound area, and were very successful in California beds in Drakes, Tomales, and Morro bays. World War II cut off the supply of seed. So far this species has not reproduced locally in any quantity. Pacific seed oysters a re now coming from Japan.
Octopus- The commercial Octopus catch is of little importance compared with most other California fisheries. Not in the least among the factors influencing this fishery is the horror with which most Americans reagrd the much-maligned octopus. To the Chinese, Japanese, Italians and Greeks, who comprise almost the entire market, the octopus is considered a rare delicacy..." The method of capturing them is interesting- " Although possessed of a pair of eyes as highly developed as our own, and a large, well functioning brain, this does not, however, prevent him from being captured in a very simple trap, the " devilfish pot". These pots are similar in appearance to deep, cone-shaped wicker baskets with a mouth the shape of a funnel opening at the top and tapering to a smaller opening in the center of the trap. A trap door is located at the small end and is used in baiting and removing the catch. The pots are lowered among the rocks in from 20 to 30 fathoms of water about one half mile off shore, and left down for a day or two. The octopus enters the trap for the bait, or out of curiosity, and cannot find his way out. ..." " Half a dozen different species of octopi are found along the coast of California, but practically the entire commercial catch consist of the big octopus, *Paroctopus apollyon* , formerly referred to *Polypus hongkongensis*, which ranges from Alaska to San Diego and along the coast of China and Japan. It is reported to reach a spread of 16 feet and a weight of 90 pounds. The average size of those delivered to the markets is between 20 and 30 pounds.' From San Pedro south to Panama, the small two spotted octopus, *Octopus bimaculatus* is found inshore among the rocks. Many of these a re captured for food by Orientals in Southern California who take them from tide pools. A large specimen of this species would span about 20 inches.

Here's how- " The following recipe is given for the more adventurous gourmets, and to those driven to desperation by

today's high food prices: Remove the tentacles, pound them as with abalone to tenderize, and skald with hot water to loosen the skin. Cook for 30 minutes in boiling salt water flavored with tomato sauce and garlic. After boiling, remove the skin, slice into chunks and serve with vinegar sauce."

Squid- " The most important squid in California is the common squid, *Loligo opalescens*, of the Pacific Coast, which has an elongated body, with fins near the posterior end. The range of this squid is from Puget Sound to San Diego, and this species of mollusk attains an over-all length of about 12 inches. It is pelagic and migratory to some extent . Although a few squid are caught throughout the year, a large percentage of the landings are made during the period from April to July, which is considered the regular squid fishing season. At this time of the year large schools concentrate in certain inshore areas for the purpose of spawning, and seem, as the fishermen term their habits to " ball up" and are attracted by lights making their impounding by round haul fishermen very easy. Although there may be other areas within the range of squid along the Pacific Coast where there may be concentrated spawnings, one of the most accessible and dependable for many years has been in the southern portion of Monterey Bay adjacent to the sardine canneries. The Los Angeles region accounts for most of the remaining small percentage of squid landings. "

The size of this squid business is somewhat amazing to the casual outsider who may have tasted squid once or twice in his life. In 1946 the canneries canned 38,000,000 pounds. In addition to the canneries there is a large market for frozen squid etc.

The figures for the totals of some of the items is little short of astonishing. For example we read that in the year 1945 alone clams were taken to the extent of 53,440,279 pounds. This does not include the 38,024,528 pounds of octopus and squid.

Johnsonia- Vol.2, no.27 The Genus Cyclostrema in the Western Atlantic by R. Tucker Abbott. Our only comment on this fine paper is to regret that Dr. Abbott did not at the same time prepare a similar report on the species from the Pacific Coast.

Vol.2, No. 28 , The Genera Xancus and Vasum in the Western Atlantic by R. Tucker Abbott. The article on *Xancus* is very complete but it is probable that most of us have these species properly labelled, and correctly in mind. However, the *Vasum* paper brings in a few new points at least to me. I have been shipping to any number of correspondents shells labelled *Vasum cassidiformis* (Kiener). It is suggested to my correspondents who read this that they change these labels to read *Vasum (Vasum) cassiforme* Kiener to agree with this report. In connection with this genus it is interesting that it seems to be consistently easy to separate the West Mexican *Vasum caestus* from the *Vasum muricatum* of the Western Atlantic by the fact that the first seems to have one less columellar folds. The two at first glance are seemingly identical.

Memorias De La Sociedad Cubana De Historia Natural vol. XIX, num. 2 Nov.,1949. This journal is devoted to the other branches of natural science although they do publish an occasional paper on mollusks. It is interesting to note that some of our conchologists have other interests. In this issue there are two fine papers by Salvador Luis De La Torre- y Callejas on Lepidoptera.

Catalogo Moluscos De Cuba - by C.G. Aguayo y M.L. Jaume- Another installment of this valuable work- Nos. 576-80 inc. While complete it is now difficult to use. We look forward to the index [illegible]

Circulares De La Sociedad Malacologica " Carlos De La Torre"- Editor Miguel L. Jaume, Calle 13 no. 351, Vedado, Habana, Cuba. This issue is pages 211-230. The price of the subscription to the circulares is $1.50 per 100 pages. Of course, they are in Spanish but for those able to read this language they contain a vast lot of malacological information of international interest.

Leaflets in Malacology vol.I no.6 A New Opisthoteuthis from the Eastern Pacific by S. Stillman Berry. This is an addition to the molluscan fauna of this coast, the type locality being 188 fathoms NW of Eureka Bay, California. The description and data is very complete but there are no figures.

vol.I no.7- Three New Pyrgulopsis from the Colorado Desert, California by Dwight W. Taylor. Mr. Taylor is now with the Museum of Zoology, University of Michigan and a member of our club. The species are well described and wellfigured. Pyrgulopsis imminens and P. blakeana are from the shore of the Salton Sea by Fish Springs, and Pyrgulopsis cahuillarum is from Fifty yards northeast of the so-called Fish Traps, 7.9 miles west of Mecca, Riverside,Co., Calif.

Many of us have extensive sets of this genus-from these localities or at least from the shores of the Salton Sea and will find it interesting to see if we are able to find specimens of Mr. Taylor's new species among them.

****

The annual Christmas Party of the Long Beach Shell Club was held at the home of Captain and Mrs. Fres Barnett. There were 46 members and guests present. We were happy to have with us our sponsor Miss Julia Ellen Rogers and Mr. and Mrs. John Q. Burch..

Captain Barnett told of his recent trip on the California Fish and Game Commission ship, the Scofield. He displayed the tags used on the fish and described the method of dredging and the type of dredges used. They made a record dredge haul of 1000 fathoms. The captain had on display some exceedingly rare deep water shells causing a general argument regarding their proper classification, but it is very probable that several of them are new species.

Officers elected for the coming year are as follows:

Mary Bormann-President
Mary Ann Barnett- Vice President
Ralph Bormann- Secretary

The Christmas tree was decorated with colordul fishing ' gigs'. Emory Chace played the part of Santa Claus for the gift exchange.

This was followed by a covered dish supper. (I note that no special mention is made here of the super fine fried fish prepared under the personal supervision of Captain Barnett).

The group decided that the year had been very successful under the leadership of H. Arden Edwards. The club sponsored the meeting of the A.M.U. Pac. Div. in June, and had a very fine exhibit of shells in the Long Beach Public Library. The club book " Shells and Shell Collecting" has gone over very well with only 50 of the original 500 books of the first edition left.

We have started to arrange our loan exhibit. Four riker mounts are finished and are on display at the California State Fish and Game Commission, Terminal Island.

The club under the leadership of Irene [illegible] is building up an extensive library and if any of the members of other groups wish to donate articles or separates on shells they will be appreciated.

****

Dr. W.L. Lloyd, Cabrillo Museum, San Pedro, Calif. The Los Angeles Sunday Times of Jan. 22 contains a feature article about Dr. Llloyd and the Cabrillo Museum which is definitely Dr. Lloyd's museum. He started it a nd built it up so that it is now an institution of international note. The museum is under the supervision or a part of the City Recreation and Park Department and Dr. Lloyd reaches the age of compulsory retirement at the end of next month. Of course, Dr. Lloyd is as enthusiastic as ever and expects to continue in some phase of the work after his retirement. It will be difficult to find a successor to fill Dr. Lloyd's shoes. No mention was made of a selection of anyone to carry on the work at the museum.

****

The New York Shell Club- We are pleased to have before us another bulletin of the new club and certainly hope that it will continue to flourish. They meet at the American Museum of Natural History, Room 129 and all persons interested in shells are invited.

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MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA- Jan.3,1950

The Conchological Club of Southern California met at the Los Angeles County Museum. The president, Mr. George Kanakoff, called the meeting to order at 7:40 P.M. welcoming twenty two members and two guests who expressed a desire to become members. They are A. Gross, M.D. 1141 26th St., Santa Monica and Richard Morr, 1244 W. 39th Place, Los Angeles 37.

The reasing of the minutes was omitted since they were published in Minutes 95 Nov.-Dec.,1949.

The Secretary-Treasurer, Mrs. John Q. Burch, gave the following report- a correction of cash on hand Dec. 31,1949 of $6.80 instead of $7.85. Dues paid to date for 33 1950 memberships total $9.00 some members paying more than the customary 25¢ annually to cover the mailing of monthly notices. Our former secretary-treasurer who resigned because of her health, sent greetings to the members and said she is improving. Members inquired for the two following addresses which were recently changed: Mrs. Effie M. Clark, 18837 Brickell Way, Hayward,Calif., and Mrs. Ora Willett, 745 W. 104th St., Los Angeles 44.

Through the courtesy of Mr. Kemp McPhail of the Standard Oil Co., Mr. Don Wolford presented a colored sound picture entitled " Marine Oddities" taken along the coast around Monterey, Calif. The colored pictures were very clear and beautiful not only the views of Monterey Bay, but the close ups of the nudibranchs and other marine animals were remarkable. The commentator should be complimented also because his statements were clear a nd interesting.

The secretary thanked those who responded to her invitation to attend the program meetings and the field trips. Dr. and Mrs. Shershow and two young sons just returned from an enjoyable a nd profitable collecting trip to Guaymas, Mexico. It is hoped that they will give a detailed report at our next meeting.

Mr. Gilbert Grau, program chairman, spoke of the program for the coming year. There being no other business the meeting was adjourned at 9:30 P.M. Mrs. John Q. Burch, Secretary.

****

Robert R. Talmadge, Box 71, Willow Creek, Calif. Note the new address.

Dr. Jeanne S. Schwengel- We are happy to hear that we may expect a visit from Dr. Schwengel and her husband General Schwengel some time in March.

AMERICAN MALACOLOGICAL UNION-PACIFIC DIVISION 3rd ANNUAL MEETING

BARBARA HOTEL, SANTA BARBARA, CALIF. APRIL 7,8,9

Chairman: John Q. Burch, 1584 W. Vernon, Los Angeles 37
Secretary: Dr. W.O. Gregg, 2000 S. Harvard, Los Angeles
Program Chairman: Elsie Chace, Lomita, Calif.
Reservation Chairman: Mrs. John Q. Burch

All shell collectors are invited to attend and make this an interesting and successful meeting.

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CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA-MONTHLY MEETING FEB. 7th
Los Angeles County Museum-Educational Department, Ground Fl., S.E. Cor.
Feb. 7th 7:30 P.M.

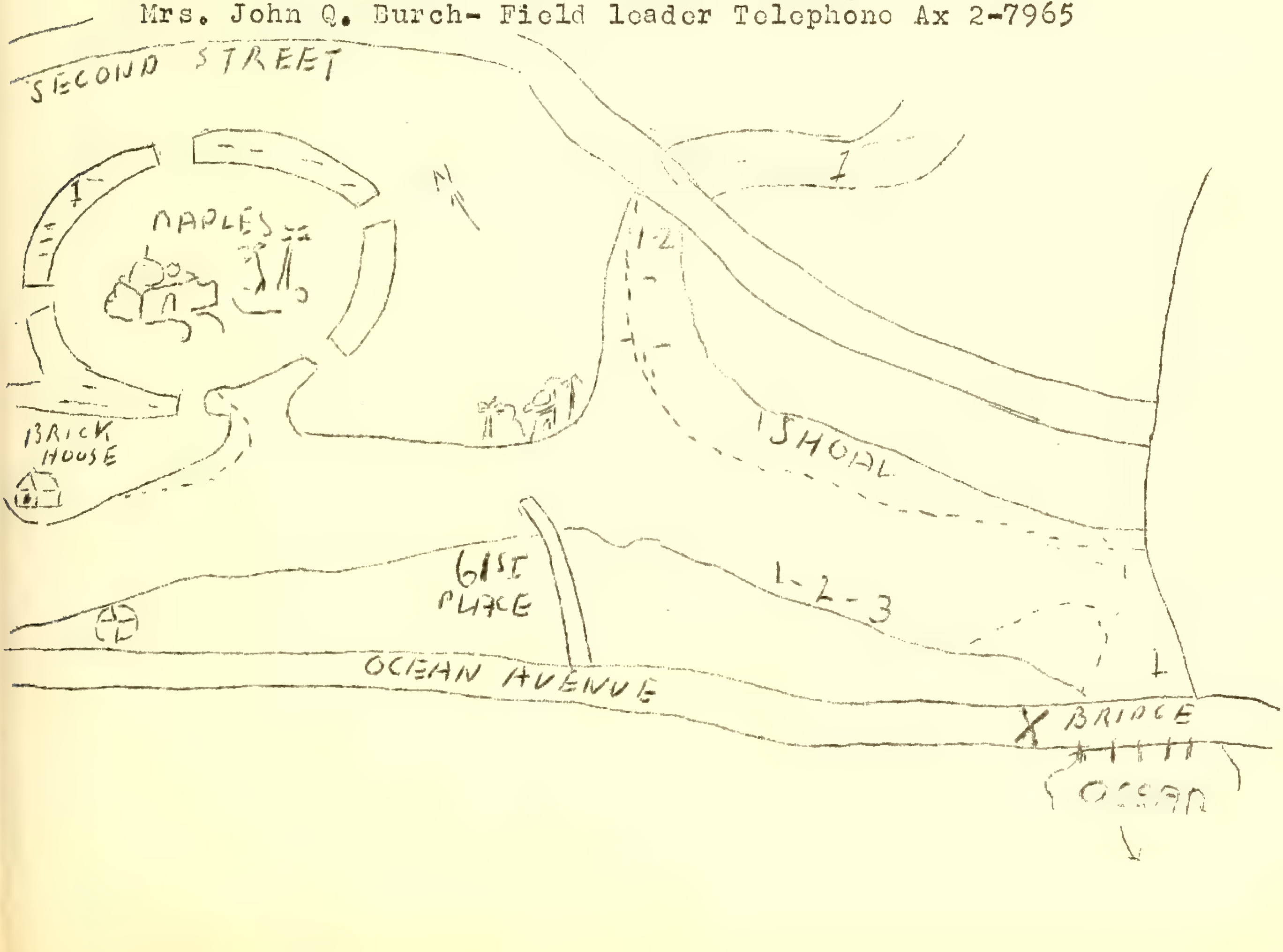
George Kanakoff-President Mrs. John Q. Burch-Secretary
Gilbert Grau-Program Chairman

Biography of Dr. Frank McFarland by -- Mrs. Elsie M. Chace
Trip to Guaymas by -- Dr. Albert Shershow
Cypraea by -- Don Wilson
Biography of Charles W. Johnson by -- Morris Schick

****

FIELD TRIP

Tide --.8 at 4:34 P.M. on Sat., Feb. 4, 1950
Plan to be in field an hour before low tide
Alamitos Bay, South part of Long Beach
Starting point Bridge X- Work toward Long Beach
Mrs. John Q. Burch- Field leader Telephone Ax 2-7965



MINUTES 97
FEB. 1950
CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA

Subscription $2.50 per year

We are now meeting the first Tuesday of every month at 7:30 P.M. at the Los Angeles Museum, Exposition Park, Los Angeles, Calif. All interested persons are cordially invited.

Please mail all news to your editor,

John Q. Burch,
1584 W. Vernon Ave.,
Los Angeles 37, Calif.
Telephone Ax 2-7965 home
or business telephone Ax 3-5710

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AMERICAN MALACOLOGICAL UNION-PACIFIC DIVISION 3rd ANNUAL MEETING

BARBARA HOTEL, SANTA BARBARA, CALIF., APRIL 7,8,9

Chairman: John Q. Burch, 1584 W. Vernon Ave., Los Angeles 37
Secretary: Dr. W.O. Gregg, 2000 S. Harvard, Los Angeles 7
Program Chairman: Mrs. Elsie Chace, 24205 Eshelman Ave., Lomita, Calif.
Reservation Chairman: Mrs. John Q. Burch, 4206 Halldale, Los Angeles

The success of this meeting seems to be assured with reservations coming in all the way from Seattle to San Diego. All shell collectors are urged to attend and make this our most interesting and successful meeting. We are hoping to have at least a few members from the east.

Those interested in participating in the program will communicate with Mrs. Chace who advises that there is room for several more papers on the program.

SOCIETY OF THE LOST OPERCULUM

Well, here we are again. After looking over some of the measurements in, we (editorially) were tempted to sneer at the feeble animals in our own collection.

We were very surprised at the response and very much gratified. Total entries to date 54 species. The asterisk ( ) represents a larger size or a correction.

Several measurements were sent in of animals not in the Phylum Mollusca. We have to draw the line some place, so are not recording these. Sorry.

Have also received some with no locality noted. Please include the place found in future lists. Some of the lists contained non-west coast shells. As this is strictly a west coast competition we had to omit those too. All entries must occur within the Panama to Alaska range, Gulf of California included.

Keep'em coming.

LIST NO. 2 SOCIETY OF THE LOST OPERCULUM

	WIDTH	LENGTH
MORRIS SCHICK		
* Polinices lewisii Gould, Newport Bay	126mm	153mm
Acanthina paucilirata Stearns, Descanso Bay	18	26
H. CARROLL McGOWAN		
Tivela stultorum Mawe- No locality		165
LOS ANGELES MUSEUM		
* Delete- Cyathodonta undulata Conrad and add		
Anatina undulata Gould, Newport Pleistocene		136
GEO. P. KANAKOFF		
Kellia laperousii Desh.- No locality	26	20
NED BAKER		
* Megathura crenulata (Sowerby) No locality	25 x 75 x	125
Parapholas californica Conrad- No locality	70	130
Pholadidea ovoidea Gould "	80	125
Zirfaea pilsbryi Lowe "	78	110
E.P. CHACE		
Acmaea instabilis Gould, Neah Bay, Wash.	Hth. 18.9 x	40
Acmaea patina Esch.(scutum Esch.?) No.Loc.	44	51
Acmaea triangularis Carp., Monterey	Hth. 4.4 x	8.7
* Astraea gibberosa Dillwyn	62	60
* Cancellaria tritonidea Gabb,Lumber Yd.,Pleist	55	91
Eunaticina oldroydi Dall,Monterey 50 fms.	59	60
Forreria belcheri Hds.,Newport Bay	107	160
Diodora aspera Esch.,Neah Bay,Wash.	26	69
Fissurella volcano Reeve,Rosarita,L.C.		39.3
Fusinus harfordii Stearns,Mendocino Co.		49
Kelletia kelletii Forbes, San Pedro		157
Lucapinella callomarginata (Carp.MS)Dall,Anaheim	21	35
Pterynotus festivus Hinds, Morro Bay		63.7
" trialatus Sby., White's Point		85
Pterorhytis foliata Gmelin,Puget Sound		87.6
" nuttallii Con. San Pedro		63.4
Thais emarginata Desh., Cayucos,Cal.		43.7
" lamellosa Gmelin, Neah Bay, Wash.		80.5

A. SORENSEN	Width	Length
* Astraea gibberosa Dillwyn, Point Pinos	65	50
* Cancellaria cooperi Gabb, Moss Landing		83
Fasciolaria princeps Sby., Guaymas		247
Fusinus dupetithouarsii Kiener, Guaymas		205
Galeodes patula Broderip "		190
Haliotis rufescens Swainson, 20 mi S. of Pacific Grove,Monterey Co.,Cal.	207	278
Hinnites giganteus Gray, Cayucos,Calif.	140	175
* Lottia gigantea Gray, Slades Hot Springs,Cal.		98
Malea ringens Swainson, Guaymas	150	180
* Megasurcula carpenteriana Gabb,Monterey Bay in 50 fathoms		93
Mytilus californianus Conrad, Point Pinos		220
Ostrea laperousii Schrench, Morro Bay		344
Phyllonotus brassicus Lamarck, Mazatlan	130	173
PAUL H. STEELE		
Cypraea cervinetta Kiener, No. locality		104
Zonaria spadicea Swainson- No locality		54
Patella mexicana Brod. & Sby. "		188

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Mr. E.J. Post, for many years an active member of the Conchological Club and known and loved by a host of friends here, died on Jan. 28th in the hospital at Tampa, Florida. Mr. Post was 85 years of age and had been making his home for the past several years in Tampa. He is survived by two daughters, Mrs. H.B. Dyer and Miss Roxana Post of Tampa,Fla. and by a soh, D.N. Post of Limona,Florida.

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Dr. Carlos De La Torre, one of the really great conchologists of all time, the author of almost countless publications, and the virtual founder of conchology in Cuba, died in Havana. The large Sociedad Malacologica " Carlos De La Torre" is but one of the monuments left to his memory. He was an active worker up to the very last. Of course, there will be many biographies of his life and work published.

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Dr. J.L. Baughman, Chief Marine Biologist, Game Fish and Oyster Commission, Marine Laboratory, Rockport, Texas, is building a collection of world wide Ostrea , and our correspondents everywhere are urged to send him a set of the local oysters of their locality. This will not only be greatly appreciated, but it has always been our established policy to help in every way any member in need of material for special research.

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Walter J. Eyerdam, 7531 19th Ave., N.E., Seattle 5, Wash. "Minutes include a lot of interesting notes but the one on record sizes of west coast shells is something that should prove of great interest and of lasting value. As soon as I get time I will contribute a few of my record and near record sizes"

Mr. Eyerdam also states " I will identify most shells for the nominal fee of ten cents per species. Minimum in tun lots for $1.- specimens returned by express collect. My offer applies especially to the marine shells of the Pacific coast of South America and the Caribbean sea. All species not identified will be returned promptly with identified species, or a desirable exchange is offered."

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PUBLICATIONS RECEIVED

The Poetry of Shells by Josiah Keep is the title of a beautifully printed book just received. This is the first printing of a manuscript left by the noted conchologist, Josiah Keep. It is published by the Eucalyptus Press which is the press of Professor Rosalind Keep, daughter of the author, and now a retired professor from Mills College. The design and execution of the book is the work of Miss Keep. Dr. Joshua Baily Jr. of San Diego wrote the introduction. Decorations are from the original pen and ink drawings made half a century ago by Laura M. Mellen for the early editions of " West Coast Shells".

The edition is limited to 225 copies. We have a few copies left from our quota and those interested may get a copy from John Q. Burch- price $3.50.

Eastern Pacific Expeditions of the New York Zoological Society XLI. Mollusks from the West Coast of Mexico and Central America. Part VIII. by Leo George Hertlein and A.M. Strong.

This part covers the Semelidae and the Donacidae. A number of new species are described and keys to species and genera for all are very clear. A few comments on this paper follow.

Semele flavescens Gould is said to range from Catalina Island, Calif. to Peru. There is no reason to question this in any way because we have it to our knowledge from Todos Santos Bay, but it must be exceedingly rare here at the northern end of its range. It would be interesting to hear if any of the members of our club have taken it locally.

Semele pacifica Dall- The range of this southernspecies is said to reach Catalina Island. I have never seen a specimen taken from California although it is not too rare from the south. We have been somewhat handicapped in studying it before this paper by the fact that the only available figures have been very poor,and most of us somewhat confused about its character. This paper has a very clear figure of it, but of a specimen from Costa Rica. We will be greatly interested in knowing of specimens of this species taken north of San Diego and with reliable locality data.

Semele pulchra Sowerby- * Note*- This is important because it involves a change of labels on sets probably in most collections of southern California shells. The authors consider S. pulchra to be a strictly southern species ranging from Nicaragua to Ecuador. The species that we have been so labelling is by this paper Semele quentinensis Dall ranging from Point Mugu,Ventura Co.,Calif. to Costa Rica. Good figures of both species are given. The key distinguishes them by stating of this species " Shell thinner, more elongate; less purple coloration.". So if you have shells from Mugu,Newport Bay etc. labelled Semele pulchra it is suggested here that you change that label to read Semele quentinensis Dall. The reason this name has been overlooked heretofore is very likely the fact that it was described by Dall from the Pliocene of San Quentin Bay,L.C. and there is an unfortunate tendency on the part of both Recent workers and Paleontologists to ignore the work of the other. The authors here seem to have established a very strong case for this change.

Cumingia lamellosa Sowerby - We have discussed this on other occasions for years in our minutes. This species is strictly southern. Our only Cumingia is C. californica Conrad.

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The Land Snails of West Virginia by Gordon K. MacMillan. Annals of the Carnegie Museum 150 pages and 15 plates. Dr. MacMillan in this paper depends entirely upon the character of the shell in contrast with Dr. Pilsbry's work whis is based largely upon the anatomy.

The Nautilus- vol. 63, no.3 Jan. 1950. The west did well in this issue. " Some preliminary notes on the distribution of Mollusca in the lakes of the western state" by Joshua L. Baily Jr. This is a very interesting paper on Dr. Baily's observations of the fauna of a number of the California lakes. Two Bacific Species of Phos by Jeanne S. Schwengel. This paper describes a species from Guam and another from Fiji. Fresh Water Mollusks from Colombia and Guatemala. Vitrinellidae of Florida by H.A. Pilsbry and T.L. McGinty is No. 5 of their fine series on this group. New West American Turrids by Paul Bartsch. This paper described 6 new species from the Gulf of California down to Panama. The figures on the plate are unusually clear, the descriptions are complete and the distinctions between the species is described. Two new genera are described Pilsbryspira and Dallspira. West coast collectors will spend a few pleasant hours deciding whether or not these are represented in their collections. Some Shells of Clear Lake, Northern Modoc County, California by G.D. Hanna. This is a very interesting paper bringing to attention the fact that we have 3 " Clear" lakes in California all located in different sections. My collection is perhaps no different from others in that it contains several sets labelled " Clear" Lake, California making something of a puzzle to know exactly which one. A List of the Land Mollusca of Claiborne County,Tennessee with Description of a New Subspecies of Triodopsis by Louis Lutz. This is an interesting and well written report by an author until now new to us.

The Texas Journal of Science vol. 1 no.3, Sept. 30,1949. In this issue there is a paper on Mollusca- " Shelled Mollusks of the Texas Coast from Galveston to Port Aransas by T.E. Pulley. This is a good check list giving ranges for this section.

Mucronalia angulata n. sp. Un Nouveau Gasteropode Parasite- by G. Mandahl-Barth from the Journal de Conchyliologie vol. 89,1949. These parasitic mollusks of holothurians are of interest not only because of themselves but because many of us know that we have parasitic mollusks both internal and external on our west coast holothurians. In our Check List I was perhaps personally responsible for inserting the name _Entoconcha mirabilis_ J. Muller. It is almost certain that the internal parasitic Melanellid mollusk found in the local _Stichopus californicus_ is neither that species nor probably of that genus. I used that name for want of any other available. Here is an open field for someone to do a bit of research.

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Dr. Jeanne S. Schwengel and her husband General Schwengel spent the month of January at Palm Springs and we enjoyed a visit when they visited Los Angeles on their way north.

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Ned Baker returned to the hospital for another operation on his hand last week. We hope that he recovers the use of it.

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From the San Francisco Examiner, Feb. 8,1950 " Add Insidelights: Some 15 years ago, the U.S. Coast and Geodetic Survey discovered two submerged mountains, many thousands of feet high , in the Pacific Ocean 75 miles Southwest of the Farallones. They were named " The Guide" and " The Pioneer", after the ships that carried the discoveries-- and then everybody just forgot about the under--water twin peaks... But now, things are happening. This week Drs. Hanna and Earl Herald of the Calif. Academy of Science set sail for that dramatic spot aboard the Navy net tender S.S. Mulberry. They've got a flock of heavy equipment with them-- and if the weather cooperates, they hope to come back with some sizable chunks of these mountains under the sea.. Smirked one of the crewmen as the Mulberry steamed out: " Betcha the first thing we dredge up is a ' No Vacancy" sign ! "

From the Pacific Telephone Magazine, Jan-Feb.,1950. Clam Brings Fame- Probably the first clam to be featured on television was recently discovered by William F. Burke, central office repair--man in San Franccisco. At any rate the clam made Bill and his wife famous. The Burkes has been clam-digging one day at Coyote Point, and were preparing their handsome haul for the pan, when Mrs. Burke cried suddenly," A freak !". At first the clam looked to Bill like any other clam, but, it proved to have the distinc--tion of three necks. Bill was shaken by the discovery. He tele--phoned the Fish and Game Commission, where an excited official referred him to the Academy of Sciences in Golden Gate Park. .The academy staff swung into action. " How soon can you get here?" Bill was asked. " Right away" , he panted " it's still breathing".

With the clam carefully cradled in salt water, Bill sped to Steinhart Aquarium, where he was met by a group of scientists and newspaper men. A seafood technician stood by to test the temperature of the water where the clam reposed.

Bill's discovery is a black clam of a species introduced into the San Francisco Bay area from the Philippines about ten years ago. It is claimed to be the only three-necker on record. At the time of this writing (December), the clam is still alive and may be seen at the Aquarium in Golden Gate Park."

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The Children's Museum of Hartford, 609 Farmington Ave., Hartford 5, Connecticut. The Children's Museum of Hartford, Mrs. Lewis P. Cheney, Director. " We are collecting shells, sponges, corals and other marine material to teach natural history to thousands of school children. We exchange surplus marine exhibits with other mailable countries and museums, in return for exhibits from their natural history surplus material. Our publication on New England Shells sells at .75 cents for a set of 3 booklets attractively illustrated. Please add .05 for postage." Dorothy A. Hapgood, Curator of Marine Department.

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New York Shell Club- Notes #2, Jan. 1950. Two very good and interesting papers came with this second issue. Mollusks of New York City Parks by Mrs. Allen L. Freas and Some Notes on the Great Calvert Shell Collection by Mr. Anthony D'Attilio.

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Clench Conchological Club, Museum of Natural History, 12 State Streetm Worcester, Mass. We are always pleased to hear of the activities, field trips, meetings with prominent guest speakers etc of this enthusiastic group.

MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA-Jan.7,1950

The Conchological Club of Southern California met in the Educational Dept. of the Los Angeles County Museum (ground floor S.E. corner of the building).

The president, Mr. George Kanakoff, called the meeting to order at 7:35. The minutes as printed in #96 of the Minutes of the Conchological Club of So. Calif. were approved as printed. The following guests were introduced: Mrs. Henry Boursin, E.E. Burson, Mrs. Laura M. Arnold, Miss La Vern Neuman, Miss Ellen K. Arnold, Miss Jeanne De Puem Miss Shirley Model, Mr. and Mrs. Austin K. Ballard, Miss Frances L. Cramer, M.C. Malone, Jack L. Baker, LeRoy Lucero, H.E. Erdman, and Drusilla Hatch.

The following is a list of recently elected members: Dr. Irene McCulloch, Dr. A. Gross, Jim Bailey, L.E. Berry, Miss Clara Blesner, Richard Morr, and Mrs. McGowan.

Mr. E.P. Chace was asked by Mr. Jose. E. Conkling to announce the shell and wildlife show to be held March9-13 at St. Petersburg, Fla. 628 4th Ave., So., St. Petersburg 7, Fla. Our members are invited to exhibit.

Dick Mayhew's Society of the Lost Operculum has created a great deal of interest and since Dick was unable to be present, the president spoke for the president of the S.L.O. and asked all to look over their west coast shells for giants to report to Dick.

The field trip leader reported on the trip Feb. 4 to Alamitos Bay. Tide --.8 at 4:30 P.M. There were 18 collectors out- weather balmy - much of the success was due to Captain and Mrs. Fred Barnett's assistance, showing shell trails and giving advice on collecting in the bay close to where the Barnetts live. The following is the only list so far. Others are urged to send in their lists.

Species Collected on the Field Trip to Alamitos Bay,Feb.7,1950 by Mrs. John Q. Burch:

Ostrea lurida Carpenter
Mytilus edulis diegensis Coe
Pecten (Plagiotectenium) circularis aequisulcatus Carpenter
Tagelus californianus (Conrad)
Lyonsia californica Conrad
Cooperella subdiaphana (Carpenter)
Laevicardium substriatum (Conrad)
Protothaca laciniata (Carpenter)
Protothaca staminea (Conrad)
Chione fluctifraga (Sowerby)
Chione undatella (Sowerby)
Apolymetis biangulata (Carpenter)
Macoma nasuta (Conrad)
Schizothaerus nuttallii (Conrad)

Vesica gouldiana (Pulsbry)
Olivella baetica (Carpenter)
Olivella biplicata (Sowerby)
Nassarius fossatus (Gould)
Erato vitellina Hinds
Polinices recluzianus (Deshayes)
Chione californiensis (Brod.)
Mactra californica Conrad

Dendraster excentricus (Eschscholtz)- Echinodermata

(con.)

Mrs. E.P. Chace gave an interesting 5 minute biography of Dr. Frank Mace MacFarland of Stanford University, Calif. who will be eighty this spring.

Dr. A. Shershow of Walnut Park, gave a short account of the trip he and his family took in December to Guaymas, Sonora, Mexico and exhibited many fine specimens. They reported the road that far south is perfect.

John Q. Burch spoke on *Laevicardium clarionensis* Hertlein and Strong, a new species from West Mexico illustrating his talk by exhibiting a paratype kindly loaned to us by the California Academy of Sciences, and compared it with juveniles of *L. elatum.* Having the privilege of seeing these together ended all confusion as to their character. He also discussed the West Mexican *Murex* s.s. illustrating the distinctions between the species with specimen shells.

Mr. M. Schick gave a very fine talk on the life and work of Charles Johnson. This talk we hope to run in a later issue of the minutes. Mr. Schick and Mr. Johnson were close friends and neighbors for many years and the intimate little things told of gave us a much clearer insight into the character of Mr. Johnson than any printed statement of his accomplishments could do.

Mr. Peterson who runs the cafeteria at the museum was introduced, and offered to serve us dinner before our meeting on the first Tuesday of each month if 20 or more persons attend. Reservations to be in no later than Friday before- Notify Mr. Kanakoff at the museum Telephone Ri 2194 or at home NO 1-2224. This will be a time for informal talks and should add to a pleasant evening.
It was announced that coffee and donuts would be served.
Meeting adjourned at 9:30

Mrs. John Q. Burch-Secretary,
4206 Halldale Ave.,
Los Angeles 37, Calif.

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Our next meeting will be held on March 7 at 7:30 P.M. at the Los Angeles County Museum, Educational Dept. S.E. Corner, ground floor. All members are urged to attend and an interesting meeting is expected.

Phone your reservations for the dinner to Mr. Kanakoff at the Museum RI 2194 or at his home NO 1-2224. The dinner will be at 6:15 P.M. before the meeting. Dinner $1.00.

The speakers will be Miss Bessie Falconer, a paper on Argonauta; Don Wilson, a paper on Cypraea; H. Carroll McGowan, a paper on Dentaliidae; John Q. Burch, review of new species of Tellinidae.

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MINUTES 98
MARCH 1950
CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA

Subscription $2.50 per year

We are now meeting the first Tuesday of every month at 7:30 P.M. at the Los Angeles Museum, Exposition Park, Los Angeles, Calif. All interested persons are cordially invited.

Please mail all news to your editor,

John Q. Burch,
1584 W. Vernon Ave.,
Los Angeles 37, Calif.
Telephone Ax 3-5710
Home telephone Ax 2-7965

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The following letter was written by Mr. Andrew Sorensen of Pacific Grove, Calif. to Dr. Tucker Abbott of the United States National Museum. We publish it here with the consent of both.

" Your article on " Snail Invaders" in Natural History for February,1950 is an excellent one and is fully enjoyed as have also been your articles on the Giant Snails (*Achatina fulica* and others).

Your articles have shown that they have been prepared with painstaking thoroughness which makes them extra valuable. I am pretty well acquainted with several of the snails you mention, especially the *Helix aspersa* Muller and *Viviparus malleatus* (Reeve) so what I shall now write will be additional information and not criticism.

When I first became principal of the Washington Union High School in Fresno county, California in 1895 I could buy, and did buy, large *Viviparus malleatus* in Chinatown Fresno. They were kept in water buckets on the sidewalks outside of the stores and retailed at 12½¢ per pound. These snails were plentiful in Fresno county even at that early date. The Chinese told me that they had been imported from Chinese rice fields to Fresno for the thousands of Chinese vineyard workers there, but I did not learn the exact year of their introduction. You mention introductions from Japan to San Francisco in 1891 and then spreading from San Francisco to

San Jose by 1900. That was spreading 50 miles on a peninsula ill suited for it, with few, if any, artesián wells and no large streams. How much easier it must have been for them to spread in the warm San Joaquin Valley with its many large rivers from the high Sierra Nevada mountains and its network of irrigation canals. As late as September, 1948 John Strohbeen and I took 50 or more in an irrigation canal 12 miles east of Los Banos, Merced county and that is 60 miles northwest of Fresno.

* * *

NEW RECORD FOR ATRINA OLDROYDI

Dr. A. Myra Keen of Stanford University sent in this note: " I had a brief note recently from two people in Santa Barbara College reporting a clam they could not identify. The description they gave could only fit Atrina oldroydi. Fishermen got it in 50 fathoms off Santa Barbara. I thought you would be interested in the record. They said the specimen measured 11 inches in length and that the fishermen who brought it up had one at least two inches longer. I suggested that they exhibit it at our A.M.U. meeting. "

* Note* This species seems to be exceedingly rare along the California coast. I have but one specimen in my personal collection from California and that was brought in by fishermen off Newport Bay a number of years ago and acquired by the late Mrs. Eshnaur from whom I got it. At least several of these were brought into Newport Bay and the Lowe collection in San Diego has some of them. The species is not as rare farther to the south along the Mexican coast. Additional notes on this species will be appreciated.

* * *

New Publications

Origin of the Pelecypod Family Glycymeridae by David Nicol- the Journal of Paleontology, v.24, Jan. 1950. This is a very fine paper illustrated with three plates. The probable evolutionary origin is well stated.

Circulares De La Sociedad Malacologica " Carlos De La Torre" Y Del Museo y Biblioteca De Malacologica De La Habana. pp 252-264 inc. These papers continue to be of great interest and may be said to have become something of an international bulletin board for malacological events. They are certainly well worth more than the $1.50 per 100 pages which they ask for these. The Revista is the fine printed periodical for which the price is $2.50. Your orders should go to M.L. Jaume, 13 no. 351, Vedado, Habana,Cuba

The Poetry of Shells by Josiah Keep was mentioned in our last issue. It is interesting to note that this book has been selected as one of the books to be entered in the Western Books Exhibition of 1950. It is a beautiful book with a very limited edition. A few copies may still be had from John Q. Burch if desired. $3.50

* * *

Natural History Museum of San Diego. The curator, Miss Viola Bristol was taken sick in August and has been hospitalized since. Dr. Joshua L. Baily Jr. is acting curator. A valuable lot of 300 tertiary fossils, all of them topo types from classic locations, were given the museum. Three other shell collections were presented to the museum, all of these since the museum opened. Three paratypes also were received from the original authorities who discovered and named these species.

* * *

We are pleased to hear that several of our members are planning to attend the meeting of the national American Malacological Union in Chicago this summer. Miss Ruth Coats, Miss Miriam Shepard.

MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA- March 7.

On March 7,1950 at 7:40 P.M. with 39 members and friends present in the Educational Dept. of the L.A.C.M., the president Mr. George Kanakoff, called the meeting to order and welcomed those present.

The president announced that the dinner which preceded the meeting was served by the management of the cafetetia of the museum. In order to have this service we must have no less than twenty paid reservations at $1.00 per dinner. All members and friends who are interested in shells are welcome to attend both the meeting and the dinner. The dinner will be served at 6:30 P.M. and the meeting will open an hour later at 7:30 P.M.

The president asked for corrections of minutes of the Feb.7th meeting. They were approved as printed in the C.S.S.C. Minutes #97.
A letter was read from the Los Angeles Chamber of Commerce thanking the secretary for sending in the information about the meetings of the society. Many inquiries were received from interested persons seeing the announcements of meetings in the newspapers.
Nomenclature chairman, Mrs. E.P. Chace reported all to date had been covered in Minutes 97.
Membership applications of the following persons were accepted:
Miss Frances L. Cramer, Jack L. Baker, and LeRpy Lucero.
Field Trip Leader, Mrs. John Q. Burch announced no good minus tides on week ends for some time, although Saturday May 6th at 7:07 A.M. there will be a fair tide and those interested in going are asked to contact the leader.
Educational chairman, Mr. H. Turver was not present so Dr. W.O. Gregg invited all persons with problems to ask for help from the committee.

The Third Annual Meeting of the American Malacological Union, Pacific Division will be held April 7,8,9 at Santa Barbara, Calif. Headquarters at the Barbard Hotel was announced by John Q. Burch, chairman.

Mr. Gil Grau presented the following program:
Miss Bessie Falconer- a paper on *Argonauta*.
Don Wilson- a paper on *Cypraea*.
H. Carroll McGowan- a paper on *Dentaliidae*.
John Q. Burch- a review of new species of *Tellinidae*.

After these papers were presented and discussed, the meeting adjourned.

Mrs. John Q. Burch, Secretary
4206 Halldale Ave., Los Angeles 37
Telephone Ax 2-7965 or Ax 3-5710

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NOTES ON CYPRAEA

by Don Wilson

It is fitting that Reeve should say in one of his first paragraphs about the cowrie shell the following lines:

> "The Cypraea is a mollusk of a very peculiar character: first on account of the different phases presented by its shell at different periods of growth; and, secondly, on account of the curious property the animal posseses of dissolving and renewing its shell. The original growth of the cowry is, undoubtedly, a process of tine; but the re-calcification of a shell at maturer age appears to be the work of a few days only."

The matter of dissolving and recalcifying the shell will be dwelled upon after a brief description of the early stages of the Cypraeacea.

Little information is available on the reproduction of these mollusks. One bit of research has been performed on the little coffee bean shell of Europe, *Trivia europea*. These laid their eggs in small capsules on a certain compound ascidian. The newly hatched larva had a small shell with operculum and two large wing-like lobes which were used in swimming. They lived among the plankton. As a second shell began to develop within, they descended to the bottom and shed the original shell. The new shell had no operculum.

It is believed that the true Cypraeidae do not have an operculum at any stage. *Zonaria spadicea* lays its eggs in July. Capsules are deposited in roughly spherical plates about 1 3/4 inches in diam-eter. Each plate has from 100 to 120 capsules and each capsule has about 800 eggs. The eggs are guarded constantly until they hatch which is about three weeks later. During this time the foot is expanded into a circular sheet that hovers over the plate of capsules.

The first stage of the shell is a single convolution around a columella axis in the form of a long drawn out bulla with a very sharp lip. The outer lip then becomes inflected and teeth begin to develop on it. Thusfar the dorsum has been zonate in color only. Teeth then develop on both lips, the base becomes callosed and a thin layer of color in waves and bands inlaid on the dorsum. Lastly the final coloration is added and the spire becomes callosed over.

In *Mauritia mappa* we find variation to this proceedure. Before the adult stage it lays a thin layer of its final patern. When this is covered by the last layer it shows through and causes the pattern to be like a network.

A problem now arises as to how the cowrie shell grows before this state. We have all seen both large and very small mature specimens of the same species along with so called juvenile spec-imens which far exceed in size the average adult specimens. The development of theories regarding this growth is quite interesting.

Bruguiere supposed that when the animal of the *Cypraea* became too large for its shell it merely crawled out of it after the manner of a crab and commenced to grow a new shell. Lamarck was of this opinion also. A Lieut. Hankey, in a letter to Reeve, modi-fied this slightly by his " observation" of the living Cypraea. He stated that he saw a specimen of *Cypraea tigris* crawl into a crevice of a rock where it lay dormant for some time. During this time it began the disolution of its shell. Soon the shell became very thin and had the appearance of a layer of shellac. This then cracked down the center and the mollusk moved away from it and began the recalcification of a larger shell. Even though the rem-aining pieces of discarded shell were very thin and delicate I find it hard to believe that Lieut. Hankey would not bring them back as evidence. It also seems that the speed with which this primitive animal must reverse its physiological processes in order to disolve and secrete its shell are exaggerated. Also, how would the s hell form in the correct shape if it had for its base a soft, naked mollusk.

Later writers such as Sowerby believed that only the outer lip and the columellar teeth were dissolved, leaving the shell resemb-ling the bulla. It then would grow a new convolution and new teeth. Such processes also seem unreasonable in shells like *Mauritiana*, *erosa*, or *stercoraria*.

Others suggested that in order to enlarge its shell the animal dissolved the interior and added the material to the outside. This may be disproven in several ways. In an eroded specimen in which the outer layer is gone the coloration of the juvenile shell may be seen showing that little has been added after the shell became mature. A cross section will show that material is sometimes added to the inside of the shell as the outside as the shell becomes callosed. This is shown in Cypraea tigris.

By a process of elimination of reasonable possible solutions we are now forced to the following conclusion: Having once reached its adult form the shell does not grow appreciably but remains that size until death. The extreme variability of size may be due entirely to environmental factors such as; food and oxyden supply, temperature and temperature variation. salt and mineral content of water, or tidal exposure.

The habitat of the cowry is very similar in most species. The common Pacific forms are nearly all found on coral reefs. Many of these are found on the seaward side of the reef showing that they must need an abundance of oxygen. This is true of ours also, for in the aquarium it is one of the first animals to die when the water fouls. A few such as annulus and lynx are found in the quiet lagoon where there is a thick growth of algae. Most species are not found far above the low tide level and a few are from deep water; marginata,hesitata,armeniaca.

They feed largely on coral animals although our species is reported to eat small anemonies, egg capsules of other snails, certain compound ascidians, sponges, the algal film on rocks, and has been seen eating dead abalone.

Geologically, the Cypraea began in the Cretaceous with one specimen from the Upper Jurassic of Sicily. Since their origin they have continually increased in number of species. The genus Umbilia was abundant in Tertiary times and Siphocypraea was common in American beds in Upper Tertiary. The genus Bernaya was widespread in the Eocene.

The oldest historical record I know of concerns money cowries. In his travels in Cathay, Marco Polo found these used as currency in Yunnan Province in the thirteenth century.

****

Charles W. Johnson 1863-1932

by Morris Schick

Mr. Johnson became a dear friend of the undersigned; a friendship that lasted until the day of his passing.

A great naturalist even at teen age, he with his parents moved to Jacksonville, Florida. In the eight years he stayed in Florida he learned much of the living things about him; he collected not only shells, insects and many forms of invertebrates, but also gained a vast knowledge of the animal life found in Florida, which stood him well in later years when he became a great naturalist and curator.

When Mr. Wilcox and others from the Wagner Institute of Philadelphia came to Florida to collect on the west side for their museum, they hired Mr. Johnson to go with them and help in the collecting. On returning they were so greatly impressed with Johnson as a young naturalist, that they employed him as curator for their museum.

He took up this work with zeal and enthusiasm. Much of the material on hand in the museum was poor and unfit and much had to be discarded In fourteen years while he was with the Wagner Institute he built up a collection and display that any museum could be proud of.

As curator of the Wagner Institute he did much hard work besides this. He did much collecting of fossil shells in New Jersey,Florida, Alabama, Mississippi,Texas and Arkansas. In May, 1890, Johnson joined with Dr. Pilsbry in the publication of the Nautilus, and much to his effort and personal cost, we have the nautilus today in its 63rd year of publication.

In 1903 Johnson was called to the Boston Society of Natural History as its curator. Here he had the hard work to do all over again in building up a run down display into a fine modern museum.

He wrote many papers for publication on natural history subjects. He was an authority on the Diptera of insect life, a member of many scientific societies. He helped to organize the Boston Malacological Club and an active worker in it.

May I quote a part of Mr. Lewis letter at the time of Mr. Johnson' passing, " the door of Mr. Johnson's room was always open whenever anyone, school boy, expert, old friend or stranger crossed the threshold his work was laid aside, His time and wealth of information were at everyone's disposal."

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Notes on Dentaliidae by H. Carroll McGowan

No other molluscan group of like rank and extent exists upon which the anatomical data are so scanty or restricted to so small a number of species; and as the class consists mainly of deep sea dwellers, the list of species now known is doubtless a mere fraction of the grand total of living forms.

The animal of the Dentaliidae is remarkable, and easily merits the rank of a separate molluscan class. It has no head, no tentacles no eyes, no heart, and no gills. It is a mollusk because it has a mantle, a foot, and a radula. Its position therefore is between the Gastropoda, which it resembles in its univalve shell and radula, and the Pelecypoda, to which it is related by the pointed foot and the absence of head and tentacles, and also by the symmetry which pervades its organization. This bilaterally symmetrical elongated mollusk is enclosed in a tapering symmetrical, shell, which is open at the two ends and slightly arched, of larger diameter at one end than at the other, the concave side representing the upper or dorsal side of the body. ....

The Scaphopoda are all marine animals ranging into deep water, many of them living only in the profounder depths of the ocean. They are found in all seas except the polar. They are sometimes found cast up on the beach by storms. They live buried in mud and sand at an angle of 45 degrees or less, and feed upon infusorians and all manner of microscopic organisms. The animal works its way into the bottom with its foot and buries itself in an oblique position with the smaller and posterior end projecting upward into the water, the opening of this end serving to convey both the incoming and the outgoing currents. Burrowing is effected as in Solen etc. by thrusting the conic foot downward, then expanding it distally for an anchor, and pulling the shell down by contraction of the foot retractor; the process being then repeated. The principal enemies of scaphopods seem to be molluscan. Some of the larger species of Dentaliidae from deep-sea stations are four to five inches in length. About 200 living species and 350 fossil species are known.

A great many specimens of the Dentaliidae dredged in New England waters are dead shells, occupied by a worm which seals up the larger opening, leaving only a small aperture through which it protrudes its long white body. These must not mislead the collector in a vain search for a mantle and other molluscan characteristics.

The shells were used for money and for personal adornment by primitive tribes. The California Indians had immense quantities of the " money shells" in circulation before they came into contact with civilization. Powers says, " From my own observations and from the statements of pioneers and the Indians themselves I hesitate little to express the belief that every Indian in the state, in early days, possessed and average of at least $100 worth of shell money. This would represent the value of about two women or two grizzly bear skins, or twenty-five cinnamon bear skins, or about three average ponies." The squaws strung about 25 large shells on a fine thread of deer sinew, usually ornamented with bits of the pearly Haliotis shell and tufts of wool from the mountain goat. The decline of the popularity of shell money dates from the coming of the trappers of the Hudson Bay Co. Blankets became the standard of value, and the medium of exchange among the Indians. In the more remote Alaskan tribes only is it found in circulation at the present day.

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THE SOCIETY OF THE LOST OPERCULUM List #3

Mr. and Mrs. Robert R. Alexander	
Conus fergusoni Sowerby Guaymas, Mexico (alive)	136 mm L
Morris Caruthers	
Acanthina spirata Blain. Morro Bay, Calif.	40 L
Arca multicostata Sby. Newport Bay	90H 120W
Astraea undosa Wood San Juan Capistrano	110 L 121 W
Botula falcata Gould Cayucos	85 L
Conus californicus Hinds Morro Bay	49 L
* Clinocardium nuttallii Conrad Morro Bay	90 H 150 W
Lima dehiscens Conrad Newport Bay	30 L 21 W
Littorina planaxis Philippi Bello Beach, Marin Co.	23 L
Lucina annulata Reeve Morro Bay	55 H 58 L
Mitra idae Melville Dana Point	57 L
Mitra idae Melville " Top lost	60 L
Ocenebra circumtexta Stearns Cayucos	30 L
Plagioctenium c. aequisulcatus Cpr. Newport	75 H 90 W
Placiphorella velata Cpr. Piedras Blancas	63 L
Pododesmus macroschisma Desh. Morro Bay	102 L 105 W
Pterynotus santarosanus Dall Dana Point	40 L
Siliqua lucida Cpr. Morro Bay	55 L
Solen sicarius Gould Morro Bay	88 L
Sinum scopulosum Conrad Newport Bay	45 L 24 W
Tegula pulligo Martyn Morro Bay	35 L 45 W
Terebra pedroana Dall Newport Bay	50 L
Tethys californica Cooper Morro Bay	90 L 64 W
Thais canaliculata compressa Dall Point Pinos	40 L
Trachycardium quadragenarium Conrad Newport Bay	118 H 120 W
Trimusculus reticulatus Sowerby Cayucos	25 W
Tylodina fungina Gabb Laguna Beach	35 L 28 W
Vesica gouldiana Pilsbry Morro Bay	55 L
Volsella recta flabellata Gould Morro Bay	170 L
* Zirfaea pilsbryi Lowe Hunboldt Bay	140 L 80 W
* Zonaria spadicea Swainson Newport Bay	65 L 27 H
* " " " "	62 L 29 H
Dr. A. Myra Keen	
Clinocardium nuttallii Conrad Alaska	146 L 136 H 102 Dia.
Rose Burch	
Haliotis sorenseni Bartsch Catalina Island	215 L 102 H
* Chlamys hericius Gould Tacoma, Wash.	82L 81 W

[illegible]

Trimuscula [illegible]

[illegible]

Walter J. Eyerdam

* Aforia circinata Dall Izhut Bay, Afognak Id., Alaska	63 L
* Chlamys hericius Gould Strait of Juan de Fuca	73 x 93
Entodesma saxicola Baird Puget Sound	115 L
Haliotis kamtschatkana Jonas Craig, Alaska	125 L x 90 W
* Hinnites giganteus Gray Strait of Juan de Fuca Weight 3 pounds 1 oz.	222L x 168 W
* Laevicardium elatum Sby. San Pedro Pleistocene	160 H
Neptunea lirata Martyn Kodiak Id., Alaska	152 L 90 W
Neptunea tabulata Baird Syrait of Juan de Fuca	110 L 51 W
Patinopecten caurinus Gould Wrangell Narrows	230 L 192 W
* Plicifusus kroyeri Moller Gulf of Peter the Great	70 L 27 W
* Pterorhytis foliata Martyn San Juan Id.	98 L 48 W
Saxidomus giganteus Desh. Seldovia, Alaska	85 H 110 L
Spisula alaskana Dall Kuiu Id., Alaska	140 L 95 W
* Thais lamellosa Gmelin "	85 L
* Zirfaea pilsbryi Lowe Seattle, Wash.	118 L 90 W

Congratulations contributors ! More lists keep coming in with some really amazing sizes, Caruthers leads with most sent in, 36 species, some of which did not better ones we already had listed , so were not listed.

Please enclose your return address.
The asterisk means a larger size than reported before.
Please do not send measurements of species not native from Panama to Alaska.

Send all entries to Dick Mayhew,
1648 S. Genesee Ave.,
Los Angeles 35

Thanks a lot for all of your lists but I can use some more. There are a lot of species that we have listed that have had no competition at all. Some, such as Lottia gigantea have been on quite a few lists. How about the others ? Can you beat it ?

****

Richard W. Foster, Harvard University- We were pleased to hear from Dick again " I leave on the 17th for 5-6 weeks collecting in Trinidad etc. and hope to return with a lot of good shells. No real land shell collecting has been done there since Guppy's day. Wish you could be along. We'd have a .. fine time.

Frank A. Waidelich- Palaus Islands - " Was cleaning a few shells the other night and just for curiosity counted how many different kinds I had cleaned. They totalled twenty eight, three of which were bivalves. This area seems to me a good place for bivalves because of the many sand flats. It seems there should be more Terebra, Mitra, Pterocera, Oliva and other sand dwellers but they are comparatively few. "

Peter J.R. Hill, Palau Islands " My job at present is mostly collecting birds, about 80 species of which have been reported from Palau, including migrants and sea birds. The Japanese introduced a number of birds, probably toward the end of the war. My guess is that they were in many cases pets in cages and that they escaped or were liberated shortly before the local Japanese were obliged to leave. These introductions include a cockatoo, probably several finches and canaries and at least one parrot. The Japanese also mixed up the botany with a huge number of ornamentals, not to mention the weeds which continually arrive from many quarters. ...Now I have a little time for shells ..."

NOTES ON ARGONAUTA by Bessie Falconer

I was asked to tell you something about Mr. W.P. Cook and his shell collection. When I called on Mr. and Mrs. Cook I found them very gracious and most interesting. Mr. Cook is nearly eighty five years old. His health is not too good, he needs to live where it is cool, so they sold their home and are now staying with his daughter at Long Beach until they find a place they wish to buy. I asked Mr. Cook when he started collecting shells. He said in 1902 he was in Puerto Rico and picked up a few, but said it was windy and he spent very little time along the shore. In 1924 we went to Hawaii to fish but found the fish were not biting, so had to turn his interest to something else. He inquired if there were any shell collectors there and was told of three different men. So he made their acquaintance and said that that was when he really started to collect.

When he returned from Hawaii he started collecting along our coast. He and his friend Mr. White would pack up their camping equipment and would go on camping trips along our coast. They collected quite extensively from Santa Cruz to the Gulf. In 1940 he went to Guaymas, Mexico and on that trip he collected 126 different species and varieties. Mr. Cook has about two thousand different species of shells in his collection. Some of them are: Conus 113, Pecten 55, Oliva 45, Olivella 16, Murex 59, Voluta 28, Harpa 6, Haliotis 40, Cypraea 128, Argonauta 15.

Mr. Cook has a nice collection of Argonauta. His largest is from South Africa and measures 10¼ inches. His next largest is 10 In. 8 3/4 In. and down to the size of a thimble.

The Srgonauta gets its name from the fabulous story of the creature sailing. This is rather misleading, because it lives in deep water. It is also called the Paper Nautilus because it resembles in shape the chambered Nautilus. But it only has one chamber. The shell is thin and translucent, very brittle when exposed to the air, but when in the water is perfectly pliable. It is not moulded on the animal, nor is it attached to the shell by mussels. The unoccupied hollow of the spire serves as a receptivle for the minute clustered eggs. The Argonauta is not a true shell but is the egg case of a species of Octopus, and its formation is for protection and incubation of the eggs. Projecting from the opening of the shell are eight slender tentacles each having two rows of small suckers. A pair of round bright eyes on the head at the base of the tentacles. The two tentacles from the base of the head extend backwards where they widen into broad thin tips which completely cover the shell. The tentacles secrete the shell and hold it in place. It is the female that had the shell, as soon as the eggs hatch she discards it. And the person who is lucky e enough to find one of these lovely shells whole and unharmed feels he has found a real prize. Mrs. Mabel Harmer has brought her Argonauta Argo that she picked up at Miami, Florida. It measures 6 x 9 inches.

The male is smaller and has no shell, its dorsal arms or tentacles are pointed and not expanded.

There are two species of Srgonauta in the Gulf of California and Mr. Cook had both of them but dropped one and broke it.

Mr. Cook has obtained Argonauta from many parts of the world and because they are so very fragile he has made his own boxes for shipping them. He has one now that has made three round trips to South Africa. The lid is fastened bu screws not nails. He did this after he had a very large specimen broken. He says he believes he would have had the largest in the world if it hadn't been broken.

Mr. Cook has written the museums all over the world except France and Germany trying to find the location of the largest Argonauta.

The largest Argonauta in the British Museum is 7½ x 11½ inches. They told him there was a larger one at the Physicians and Surgeons Museum, but was destroyed during the war.

There is a specimen of Argonauta Argo at the Natural History Museum of Boston that has long been considered the largest in the world. The man who obtained it is said to have paid $500.00 for it. But from the figures Mr. Cook obtained from the American Museum of Natural History in New York of the same variety seemed to be slightly larger.

I will not go into detail of the different species, but the Argonauta nodosa has two varieties- one with large knobs and coarse sculpture, the other with low knobs and fine sculpture. It is found in South Australia, Tasmania, New Zealand and Cape of Good Hope, Chili, Brazil, and the Philippines.

Argonauta argo is found in the seas of warm latitudes, particularly those of the Mediterranean, New Holland, Cape of Good Hope, and South America.

On the Atlantic coasts the Argonauta is found mostly on the Florida shores, but occasionally they will be found as far north as New Jersey.

On the Pacific coast we have the Argonauta pacifica and it is found from Santa Cruz Island to the Gulf of California. I was told by a shell collector (not a member of this club) that the Argonauta pacifica if left in the air dissolves. Mr. Cook told me he visited a man in Santa Barbara a few years ago and saw an Argonauta that he had had for fifty years, and it was in good condition.

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MINUTES 99

APRIL 1950

CONCHOLOGICAL CLUB OF SOUTHERN CAIFORNIA

Subscription $2.50 per year

We are now meeting the first Tuesday of every month at 7:30 P.M. at the Los Angeles Museum, Exposition Park, Los Angeles, Calif. All interested persons are cordially invited.

Please mail all news to your editor,

John Q. Burch,
1584 W. Vernon Ave.,
Los Angeles 62, Calif.
Telephone Ax 2-7965 home
or business telephone Ax 3-5710

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AMERICAN MALACOLOGICAL UNION- PACIFIC DIVISION 3rd ANNUAL MEETING
Barbara Hotel, Santa Barbara, Calif. April 7,8,9

The meeting was interesting and pleasant, the papers being well prepared and delivered. Fifty persons registered and eight others attended part of the session making fifty eight in attendance. There were forty eight guests at the annual banquet held in the Del Norte room.

One of the nice things about the meeting was that we were all registered in the one hotel, and between meetings were visiting, talking shells and becoming better acquainted with each other about the lobby and elsewhere. The Del Nobte Room where the meetings were held was large and perfectly equipped with the entrance directly from the lobby on the ground floor. A screen and all suitable projectors were available for illustrating the talks.

Many visited the Santa Barbara Museum of Natural History and other points of interest but our time was somewhat limited for these excursions. There was a general feeling of regret that the session was not longer when we reluctantly disbanded.

PROGRAM

John Q. Burch- Chairman
Dr. Leo G. Hertlein- Vice-Chairman
Dr. W.O. Gregg- Secretary-Treasurer

Councillors-at-Large
Miss Ruth E. Coats
Dr. S.S. Berry
Dr. Joshua L. Baily Jr.
Dr. A. Myra Keen

Convention Committee
Program- Mrs. E.P. Chace
Arrangements and Reservations- Mrs. John Q. Burch

Friday, April 7
1:30 Registration of members and guests. Registration fee 50¢
2:15 Address of Welcome and meeting called to order by the chairman.
2:30 A. Sorensen- Exemplified discussion of shell development in marine mollusks
3:15 Dr. H.R. Hill- Exotic Mollusca in California
3:45 Dr. Joshua L. Baily Jr.- Taxonomy of the Gastropods
8:00 P.M. Allyn G. Smith- Rediscovering the Farallon Islands, an illustrated lecture

Saturday, April 8
9:30 a.m. Business session
10:30 a.m. Walter J. Eyerdam- Placostyla
11:15 a.m. Dr. A. Myra Keen- Species of the Cardiid genus Clinocardium
2:00 p.m. Dr. A. Myra Keen- Ancestral history of the living Brachiopoda
2:30 p.m. Ernest N. Wilcox- Conchology in My Own Backyard
3:30 p.m. Allyn G. Smith - Fusinidae of the west coast of North America
8:00 p.m.- Banquet- Del Norte Room, Barbara Hotel

Sunday, April 9
9:30 a.m. Election of officers
10:00 a.m. Dr. Leo G. Hertlein- Pearl oysters of the Gulf of California
10:30 a.m. Dr. W.O. Gregg- Collecting land snails in southeastern Arizona
11:00 a.m. George Kanakoff- The upper Pleistocene fauna of Newport Mesa
11:30 a.m. E.P. Chace- Some notes on Polinices

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The following offivers for the coming year were unanimously elected.

Dr. Leo G. Hertlein- Chairman
Dr. W.O. Gregg- Vice-Chairman
Allyn G. Smith- Secretary-Treasurer

(Con.)

MEMBERS IN ATTENDANCE AT THE A.M.U.P.D. MEETING-APRIL 7,8,9-1950

Mr. and Mrs. Robt. R. Alexander, 4759 Valencia Dr.,San Diego,Calif.
Dr. and Mrs. Joshua L. Baily Jr., 4435 Ampudia St.,San Diego,Calif.
Lloyd E. Berry, 846 W. 42nd Place, Los Angeles, Calif.
Vera von Block, 2328 11th Ave., Los Angeles, Calif.
Mr. and Mrs. John Q. Burch, 4206 Halldale Ave., Los Angeles 62,Calif.
Mr. and Mrs. E.P. Chace, 24205 Eshelman Ave.,Lomita, Calif.
Miss Ruth E. Coats, 702 E. First St.,Tillamook, Oregon
Mrs. Emma Coats, 702 E. First St., Tillamook, Oregon
Mr. and Mrs. Walter J. Eyerdam, 7531 19th Ave., N.E., Seattle,Wash.
Mr. and Mrs. Ralph O. Fox and 2 daughters, 1048 Monterey Ave.,
Berkeley 7, Calif.
Gilbert Grau, 2457 Claremont, Hollywood 27, Calif.
Dr. Wendell O. Gregg, 2200 S. Harvard Blvd.,Los Angeles, Calif.
George L. Harrington and Mrs. Harrington,566 Washington Ave.,
Palo Alto, Calif.
Wm. C. Harrington, 308 Mt. View, Taft, Calif.
Dr. L.G. Hertlein, Calif. Acad. Sci., San Francisco, Calif.
Dr. and Mrs. Howard R. Hill, 4262 Angeles Vista, Los Angeles, Calif.
Merton E. Hinshaw, Museum of Natural History, Pacific Grove, Calif.
Frank Hoover, 431 E. Century Blvd.,Los Angeles, Calif.
Margaret C. Irwin, 112 Chapala, Santa Barbara, Calif.
Mr. and Mrs. George P. Kanakoff, 4315 Sunset Dr., Los Angeles 27
Dr. A. Myra Keen, Stanford University, Stanford, Calif.
Josef Monroe Langlo, 962 Isleta Ave., Santa Barbara, Calif.
Mr. and Mrs. H. Carroll McGowan, 603 N. Aliso St., Santa Barbara
Harlow Merrick, 1120 N. Milpas, Santa Barbara,Calif.
Richard Morr, 1244 W. 39th Pl., Los Angeles, Calif.
Dave Packard, 822 So. Spaulding, Los Angeles, Calif.
Morris Schick, 715 S. Central Ave., Glendale 4, Calif.
Miss Agnes J. Shumate, P.O. Bx 474, Ocean Park, Calif.
Allyn G. Smith, 722 Santa Barbara Rd.,Berkeley, Calif.
Andrew Sorensen, 247 Granite St., Pacific Grove, Calif.
Diana L. Sorensen, 814½ No. Coronado St., Los Angeles, Calif.
S.L. Sorensen, 814½ No. Coronado St., Los Angeles, Calif.
Mr. and Mrs. Phil Spicer, Rt.2m Bx 633, Centralia,Wash.
Mr, and Mrs. John Strohbeen, 1135 King, Santa Cruz, Calif.
Mr. D.D. Taylor, 1955 Mendocino Lane, Altadena, Calif.
Dwight W. Taylor, 1955 Mendocino Lane, Altadena, Calif.
Mr. and Mrs. Harry R. Turver, 8640 Evergreen, South Gate, Calif.
Mrs. Hazel Whelchel, 303 Abby St., Fresno, Calif.
Mr. and Mrs. Ernest N. Wilcox, 1738 Johnson Ave., San Luis Obispo,
Calif.
Don M. Wilson, 444 W. 79th, Los Angeles, Calif.

THE TAXONOMY OF THE GASTROPODS

By Joshua L. Baily Jr.

It is not my intention to propose a new classification of the gastropods. That is a task for better qualified intelligences than mine. I can only point out the defects in the older systems to show why a new one is so urgently needed.

You are all doubtless familiar with the definition of evolution given by Herbert Spencer which I cannot quote. It was something about a transition from an integrated homogeneity to a differentiated heterogeneity. This is simply a high toned way of saying that evolution tends to proceed from the simple to the complex. By and large this is true, but there are many instances in which organisms have evolved in the direction of simplification-the tape worms perhaps affording the best example. The fact is that when an organism adapts itself to a changed environment it not only develops new structures to perform new functions, but it also loses those structures which perform functions no longer necessary.

Now classifications are based upon structural modifications . Similar structures indicate a real relationship if they can be shown to have been inherited from a common ancestor: The perforations in the shell of Haliotis, the poison glands of Conus, the vertical fin of the Heteropods, are structures of this sort, for they demonstrate the relationship of those species which possess them. But there are other structures which aquire a similarity through being adaptive. The eye of the Cephalopoda is structurally similar to that of the fish- cornea,lens,retina, are the same in each. But the embryological development of these groups shows that their eyes are in no sense homologous - they have been derived from different tissues by widely different processes, and have come to resemble each other as the result of convergent development.

It is clear that there is another way in which diverse organisms can come to resemble each other- by the loss of those structures which distinguish them. My grandfather used to amuse his grandchildren by asking them a riddle- " Why is a rabbit like an elephant ?". The answer is " because it can't climb a tree." But the immediate ancestors of the rabbit almost certainly did climb trees, and the loss of this ability has resulted in a slight superficial resemblance to the elephants whose immediate ancestors never did possess this ability.

An example of this kind of resemblance is afforded by the two limpets- Acmaea insessa and Lanx subrotundatus. The shells of these animals, (which are all that one sees when they a re alive, attached to the rocks) are almost indistinguishable- yet their soft parts prove them to belong to different orders.

Every system of classification which has ever been devised for the gastropods has been based to a large degree on the structures which have become simpler as they have evolved, or which have even dissapeared. Consider the nervous system. In the most primitive of all Mollusca, the Amphineura, formerly considered a subclass of Gastropoda, there are four nerve cords, all arising from the brain and extending backward to a point of union in the rear. In the primitive Gastropoda there are only two such cords, and these cross each other about half way between the two extremities of the body, so that in the posterior half of the body the right cord is on the left side of the body, and vice versa. Viewed from above the nervous system has approximately the form of the numeral 8, with two loops, one anterior, the other posterior.

The more highly specialized Gastropoda have but a single neural loop,however, which fact caused Pelseneer to divide the class into two subclasses- the Streptoneura with two neural loops, and the Euthyneura with one. We know the Euthyneura to be the more evolved subclass because in their embryological development all Euthyneura pass through a streptoneurous stage. How do the Euthyneura lose one of their neural loops ?

This subclass consists of two orders- the Opisthobranchiata and the Pulmonata. According to Borradaile and Potts the process by which the number of loops is reduced is quite different in the two orders. In the Opisthobranchs the reduction is brought about by an untwisting, so that the resulting single loop is homologous to the two loops of the Streptoneura, while in the Pulmonates it is brought about by the atrophy of the posterior loop, so that the remaining loop is homologous only to the anterior loop of the Streptoneura. The muscles which ordinarily are activated by nerves arising from the posterior loop are, according to this view, in the Pulmonates activated by secondarily developed nerves arising from the anterior loop, so that the nervous system of the Pulmonates is not homologous with that of the other gastropods. Also, according to this view it follows that the relationship of the Opisthobranchiata with the Streptoneura is much closer than that of either of these groups with the Pulmonata.

Next, consider the gills. The primitive gastropod had a pair of gills symmetrically disposed about the axis, each of which had two rows of pectinations, but the majority of living hastropods have but a single gill with a single pectination. Between these extremes every conceivable gradation occurs- paired nonpectinate gills, a single bipectinate gill, a nonpectinate gill on one side and a bipectinate gill on the other, and in the genus Valvata there is a bipectinate gill on one side and a nullipectinate gill on the other. The latter is, of course, not functional, and is on its way to complete atrophy.

The case of Janthina is peculiar. None of the classical works on taxonomy discuss the gills of this genus, but several figure them with little agreement among them. Some illustrations show four pectinations, which indicates paired bipectinate gills; some show only two pectinations, which may indicate either paired monopectinate gills or a single bipectinate gill; and one figure shows no gills at all. If the occurrence of paired gills in this genus could be demonstrated the taxonomic position customarily assigned to it can hardly be maintained.

Now let us postulate two hypothetical families which differ only in the structure of their gills. Let us assume first that one family has a single bipectinate gill and the other a pair of monopectinate gills. In each case there will be two pectinations, but in the one instance they will both be on the same gill, and in the other on opposite gills. Then let us suppose that in the natural course of evolution the one family loses a pectination and the other loses a gill. The end result will be the same in both cases- a single monopectinate gill, and since no other difference was postulated it will not be possible to discriminate between the two progenies of the two quite distinct ancestral origins.

It so happens that in the largest (numerically) suborder of the gastropods there is but one gill, which has but one pectination. The immediate ancestor of this suborder, the Monotocardia, may have had a single bipectinate gill, or paired monopectinate gills, or possibly the group may be polyphyletic with several different

origins. If the latter should prove to be the true condition, and it is not unreasonable to suspect that it may, then it will be necessary to break up the suborder into a number of new ones with separate affinities. Unfortunately the gills alone throw no light on how this should be done, or even whether it should be done at all.

Another organ on which gastropod taxonomy has been based is the heart, which in the primitive form consisted of ventricle and a pair of auricles. In the more highly developed forms a single auricle survives alone. The division of the Streptoneura into Diatocardia and Monotocardia is based on the atrophy of the auricle. The auricle is closely associated with the gill, and in the specialized forms with only one of each the surviving auricle and the surviving gill are always on the same side. But in transitional forms we find two gills and one auricle; in others one gill and two auricles. So far as we can see either of these may have been the ancestor of the Monotocardia, or both may have been, so that again the suborder may by polyphyletic- another reason for its dismemberment.

So far as I am aware no one has ever suggested basing a classification on the kidneys. In the primitive Gastropoda the kidneys were paired, but the specialized forms have only one kidney. A complication arises here. In those species with a single gill and auricle these structures are always on the same side. The single kidney is generally but not always on the same side as the gill and auricle. Sometimes it is on the opposite side. This condition, it seems to me, has taxonomic value, though apparently no taxonomist has taken advantage of it.

The fact that the surviving kidney may or may not be on the same side as the gill and auricle shows that the reduction process is quite independent in the two sets of organs, and that it would therefore be quite reasonable to suppose that the transitional formsoccur in which two kidneys are associated with one gill, or two gills with one kidney. Either of these hypothetical forms might give rise to the usual form with one of each of these organs. Thus the mere presence or absence of a kidney is of no more significance taxonomically than that of a gill.

Finally let us consider the radula, In the primitive Amphineura there are almost always seventeen teeth in each transverse row, no two of which are alike. In the most primitive gastropods, the Rhipidoglossa, there may be about 200 teeth in each row, owing to the multiplication of the marginals, which are always reckoned to be indefinitely numerous.

One of the lateral teeth is known as the capituliform tooth. It differs conspicuously in size and shape from the other lateral teeth. In some genera it is on the outside, next to the marginals, and in others on the inside next to the medians, and in still others there may be no capituliform tooth at all. The simplest way in which to account for the variable position of the capituliform tooth is to assume that in the ancestral form it stood in the midst of the lateral teeth, and that in the course of their evolution some of the genera have lost their inside laterals and others their outside laterals.

Support for this view is given by the Taeioglossa. In this group there are almost always exactly seven teeth in each row. Of these the two outside pairs are considered to be marginals. But they do not resemble the marginals of the Rhipidoglossa as much as they do their own laterals, and so it seems more reasonable to assume that the so-called laterals of the Taenioglossa are

homologous to the inside laterals of the Rhipidoglossa, and that the so called marginals of the Taenioglossa are homologous to the outside laterals. According to this interpretation the Taenioglossa have been derived from the Rhipidoglossa by the loss of the capituliform tooth and all of the marginals.

The peculiar deep sea limpet *Broderipia* was formerly classed with the Taenioglossa on the ground that their seven teeth were homologous with those of that tribe. But it is now believed that the radula of *Broderipia* has two pairs of laterals and but one pair of marginals, and it is now united with the Rhipidoglossa, since its teeth are not strictly homologous with those of the Taenioglossa.

Similarly, it may well be that other genera may exist among the Taenioglossa whose radulae, although conforming to the same formula, cannot be brought into one-to-one correspondence with each other. Probably the genus of land operculates commonly called *Acicula* but which are not entitled to that name, is an example. Its teeth bear no resemblance whatever to those of any other Taenioglossa, and it seems to have been derived from Rhipidoglossa by an altogether different path of descent. A careful study of taenioglossate radulae might possibly reveal several independent lines of derivation. In making such an investigation it might be born in mind that the number of teeth, or the presence or absence of a specific tooth, has but little taxonomic significance, since any organic structure may be lost at any time in its development; on the other hand the shape of the teeth is highly significant. The reason why Tryon was so distrustful of the radula for taxonomic purposes was, I believe, due to the fact that those who based taxonomic schemes upon it depended too much upon formulae which indicated only the number of teeth and their position, and told nothing about their form. The tacit assumption was always made that teeth occupying the same position on different radulae were always homologous; we now know that in many instances they are not. Even the median teeth is not always homologous to other median teeth; in some instances the primary median seems to have dissapeared and in its place a secondary median seems to have been developed from the two innermost laterals on each side by fusion.

As an example of the danger of relying too much on dental formulae we may compare the radulae of *Epitonium* and *Conus*. In each case the radula is made up exclusively of marginal teeth, indefinite in number, so that both genera have the same formula, but the teeth differ widely in shape. In *Epitonium* the teeth are probably true marginals, but in *Conus* they seem to be modified laterals.

For a brief minute before closing let me contrast the gastropods with the pelecypods. In the latter evolution has consistently been from a simple structure to one of greater complexity. Three of the structures used as taxonomic criteria are the mantle, the gills, and the hinge teeth. In its most primitive form the mantle is entirely free at the edges; successive points of fusion set off the excurrent and incurrent siphons, and separate the byssal and pedal orifices. The most primitive gills are unfolded, then the folds were developed followed by interlocking bristles which kept them folded, and finally the reticulated gills of the more highly specialized forms appeared. The primitive hinge had no teeth but consisted entirely of ligament. The most primitive cardinal teeth were taxodont- each tooth was exactly like every other tooth. Even the miscalled lateral teeth were originally taxodont, The more complex hinges, in which both anterior and posterior lateral teeth

can be recognized in addition to cardinal teeth, were the last to develop. Further, the genera which are primitive with respect to one character are likely to be primitive with respect to other characters, so that the accounts of their evolution which they tell us are confirmatory. It has been quite otherwise with the gastropods in which the effect of evolutionary development has been to obliterate the paths by which it has been achieved. Consequently a satisfactory taxonomic system for this class remains to be devised. For my own part I feel that the radula offers the greatest hope for the solution of this problem, but to be made to serve as such it must be correctly interpreted.

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Our group picture taken at Santa Barbara caused some of us to enjoy a very hearty laugh, not so much at our own appearance because the picture was really excellent as group pictures go, but we assembled for the picture in the Del Norte Room which is famous for its fine large mural paintings of early Spanish days. The result was that when the picture was developed there seemed to be a number in the back row who were certainly not members. For those who may be interested the mural is entitled " El Fandango a la Casa De la Guerra 1836" and none of those in attendance were dancing the fandango.

And while on the subject of the group picture, those who purchased copies may, if they wish, write Mrs. John Q. Burch and receive a list of the names of those in the picture in order.

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SOCIETY OF THE LOST OPERCULUM

Many of our members have boasted of having giants in their cabinets and announced their intentions of sending in the measurements. Most of them have failed to do so. Some have found this interesting and we think it worth while so please measure up your largest shells and send the data to Dick Mayhew, 1648 S. Genesee, Los Angeles 35, Calif.

The following were sent in this month:

Captain W.S. Bitler	
Agaronia testacea Lamarck, Panama Bay	66 mm
Conus purpurascens Broderip "	81 mm
Captain C.M. Dumbauld	
Mitra attenuata Reeve, Panama Bay Palo Seco Beach	75 x 17½ mm
Cymia tectum (Wood) , Perlas Islands, Panama	68 x 38 mm
Solenosteira fusiformis pagoda Reeve "	56 x 25 mm
Miss Agnes Shumate	
Tivela stultorum Mawe, Oceano, Calif.	166 mm

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Professor Davidson of Santa Barbara College paid us a visit at Santa Barbara and brought with him fine specimens of Atrina oldroydi brought up by fishermen off Santa Barbara. We had mentioned this before but it was interesting to note the large size of these shells. This is an extention of range northward for this species also. It may also be mentioned that it is not at all rare and the fishermen bring them up frequently. We have always considered it to be an extremely rare species.

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Mrs. Effie M. Clark, 7927 Seven Hills Road, Castro Valley, Calif. Note the new address.

Mrs. Lena Higgins, 2224 Orange Ave., Long Beach, Calif. Mrs. Higgins is in the hospital recovering from a very serious automobile accident. She suffered a fractured right knee and it was thought a skull fracture but that fortunately is not true and she is doing well.

Daniel Littlefield Emery - Mr. Emery died on April 11 in St. Petersburg, Florida where he had made his home for many years. He was 89 years of age although those who knew him never thought of him as ever being elderly. The last we saw of him on this coast was when he attended the A.M.U. convention at the Asilomar, Pacific Grove three years ago and we all remember his enthusiasm and interest not to mention his knowledge of shells. Following that convention he visited here in Southern California for some time staying with his nephew, E.P. Chace.

Mr. Emery spent a great deal of his life collecting shells and accumulated a very fine collection which he presented to the St. Petersburg Museum. He was twice president of the St. Petersburg Shell Club and was known and loved by a host of shell people the world over through his many exchanges and correspondence.

He is survived by his wife, Frances Emery; a sister, Mrs. Celia Chace, Redlands, Calif.; and a granddaughter, Mrs. Charlotte Wiggle of Coronado, Calif.

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An Addition to the Molluscan Fauna of West Mexico

Mr. Andrew Sorensen of Pacific Grove collected a specimen of Ostrea at Guaymas, Mexico two years ago. The species remained a puzzle and Mr. Sorensen sent it to Dr. Harald Rehder for classification. Dr. Rehder advised Mr. Sorensen (letter of March 15,1950): " I forwarded to Dr. Ranson (Paris Museum). He wrote that the shell in question is Pycnodonta hyotis Linne. This is the shell that Dall called Ostrea fisheri; Ranson believes that the Gulf of California species is inseparable from the Indo-Pacific Hyotis."

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Professor Trevor Kincaid , University of Washington, recently sent me a vial of very small pelecypods which proved to be beyond my ability to classify so in turn I forwarded them to Dr. A. Myra Keen of Stanford University. Dr. Keen advises: " I am returning the little pelecypods under separate cover. They seem to be young Rochefortia tumida, or perhaps I should say adolescent shells, as they are about 2/3 normal size. The outline is more that of R. pedroana but perhaps it changes with further growth. There is no other northern species which they might be, so far as I can make out."

* Note* It is interesting that this species, usually taken commensal on the sea mouse etc. should be taken in large numbers around the oyster beds of Puget Sound.

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Dr. A. Myra Keen, Stanford University

" You asked for further information about the course I am teaching. It is titles " Mollusca (except Cephalopoda) and will be given Spring Quarter each year from now on. It is a two unit course, which means two meetings per week plus a few hours of outside work on the part of the students. The outline work consists of readings, identification of specimens, and two short reports on selected genera. This quarter I have eight registered students and two auditors. Next year in addition to this course, I will be in charge of a course entitled " Problems in Malacology" for any advanced students interested in research; the latter course, will carry through the entire academic year."

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Dr. A. Haven Smith, 222 N. Pine St., Orange, Calif. The Santa Ana Register of March 19,1950 certainly gave our member Dr. Smith a fine piece of publicity. A full quarter of the front page of Sec.B was ddevoted to his shell collection with personal photographs.

New Publications Received

The Nautilus, April, 1950 Vol. 63, No. 4- The West Coast is well represented in this issue.

" A New Verticordia from the Pacific Coast" by Dr. Arthur D. Howard. An interesting new species well described and excellently figured from Lower Calif., Angel de La Guardia Island and also a specimen from off Catalina Island in 105 fathoms. So we add to the fauna of California- *Verticordia aequacostata* Howard.

Professor Ostergaard of Hawaii describes a new species of Cypraea- *Cypraca alleni* naming it after the collector, Mr. Charles A. Allen, an enthusiastic member of our club while he was a rodident of Los Angeles during the war years.

" Locomotion in Lima" by Dr. Joshua L. Baily Jr. An interesting short paper and reminds one of how unobservant some of us can be. I have seen Lima swimming many times but never thought to study its method. This paper also brings to mind the fact that most of our West Coast collections have the local California littoral species classified *Lima dehiscens* Conrad instead of *Lima hemphilli* Hertlein and Strong.

" West Indian Marine Mollusks from Southern Brazil" by Walter J. Eyerdam.

" Some Wrong Indentifications of Sphaeridae" by Rev. H.B. Herrington. This paper affects our discussions in Minutes 69m1947 in which were discussed the California species of Sphaeridae.

" A List of the Land Mollusca of Claiborne County, Tenn...." by Louis Lutz and " Some Mollusks Near St. Petersburg, Florida" by Bernadine Bakker Baker.

" On the Selection of Lectotypes" by Richard I. Johnson.

" New Marine Mollusks from Dominica, B.W.I. " by A.H. Verrill

" Science and Legality" by H. Burrington Baker. This is a very fine paper on selection of types etc. and should be read by all students interested in taxonomy. Dr. Baker makes a strong case against many common practices.

" New Records of Land Snails from Wisconsin" by Lorna R. Levi and Herbert W. Levi.

" Hiatella Daudin Versus Saxicava Bellevue " by Henry Dodge. Mr. Dodge's paper is (to be continued) but he will certainly do a turn for all if he can settle the confusion between these two generic names. The universal custom in our group is to use *Saxicava* , but a number of recent authors such as Cotton and Godfrey in their fine work " The Mollusks of South Australia" 1938 p 284 surprise us by using *Hiatella* Daudin and stating that *Saxicava* is a synonym.

Proceedings of the Malacological Society of London, March, 1950 vol. 28, parts 2 and 3 . This issue contains a number of papers of great general interest. " Torsion in Gastropods" by N.B. Eales " Pomacea of New Guinea" by T. Pain; Biochemistry of Molluscan Shell Pigments by A. Comfort. Dr. Comfort is doing some very scholarly work on the color pigments of shells. In this paper the *Haliotis rufescens* of this coast is mentioned and other references are of local interest. It contains an excellent discussion of the shell of *Haliotis cracherodii*. " A Note on the Eggs of Octopus vulgaris Lam. from the Western Atlantic" by Grace E. Pickford. " Notes on Cephalopoda from the Caribbean" by W.J. Rees. Another fine paper and well illustrated with five plates.

Natural History Museum Bulletin, San Diego April,1950. The first note is of genuine interest to all conchologists interested in the fauna of this coast. " The Scripps Institution of Oceanography who are the proprietors of the Baker-Kelsey collection have decided that the purpose for which the collection is maintained is not served by the inclusion of types, and have agreed therefore to deposit all the types now in this collection in the collection of the Natural History Society, Accordingly, co-types of Rissoina kelseyi Dall, Odostomia kelseyi Bartsch, and Alvania grippiana Dall have already been added to this Society's collection, with the promise of more to come."

* Note* In this connection it might be fitting to make an urgent suggestion to all large eastern institutions including the U.S. National Museum. It is a long trip across this continent to see a type, and it is certain that IF good paratypes are available of West Coast species and a gift of one of these were made to any of our West Coast institutions, this would be appreciated not only by the institution receiving it but also by every worker on the entire West Coast. It is not too difficult to take a problem to the California Academy in San Francisco, to Stanford University, to the San Diego Museum of Natural History etc. It would be fine if the type we wished to study were in any of them but we are regularly confronted with the problem of having to cross the continent to check to see whether we have a new species in hand or perhaps one of Dall's unfigured species. If they were all well figured it would help some but a host of our west coast species were described with a few lines and never figured, and some of the descriptions might well describe any one of a dozen different species. The only solution is to see the type to know just what the author of the species had in mind.

Circulares De La Sociedad Malacologica " Carlos De La Torre" pp 265-286. This mimeographed paper is of genuine interest and value and if you are not receiving them you are missing many valuable news items pertaining to malacology. The cost is very nominal $1.50 per 100 pages and should be sent to Miguel L. Jaume, 13th St. No. 351, Vedado, Habana,Cuba.

Correspondenblad Van De Nederlandse Malacologische Vereniging. This is the mimeographed new report of the Netherlands society and contains at times some valuable collecting records and other data.

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We are in receipt of Frank Lyman's catalogue of rare Florida Liguus. If you are interested in this group you should write for a copy- Frank Lyman, Lantana, Florida

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Walter F. Webb of St. Petersburg, Florida made the front page of the newspaper with an excellent article about his life work with shells and a photograph of Mr. Webb working at his cabinets. Mention is made of the Webb collection in the Chicago Museum of Natural History, certainly one of the greatest private collections every accumulated, 100,000 specimens of 12,000 different species. Mr. Webb is as you all know still an active dealer in fine shells and has in his time probably sold more rarities than any other man who ever lived.

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Nature Lab, 218 Lincoln St., East Orange, N.J. Their current catalogue lists rather a surprising number of mollusks in formalin and otherwise prepared for study.

The Conchological Club of Buffalo, N.Y. We are pleased to see the activity of this club as outlined in their mimeographed bulletin. Mrs. Margaret Teskey is secretary of the club.

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Mr. Allyn G. Smith showed some pictures at the Santa Barbara meeting in one of our off schedule pleasant interludes. They were thrown on the screen and discussed. They were of the work of the Navy Net Tender and the deep water dredges being used under the supervision of the California Academy of Sciences. The work of this survey is scheduled to continue until next October. The size and weight of the dredges being used is amazing. Not only are they bringing up unheard of species from abyssal depths but are also discovering and surveying other remarkable things.

One thing that will certainly appeal to the immagination of anyone is the three submarine mountains. Immagine working in depths of 10,800 ft. and discovering Pioneer Mount 8000 ft. high, Mulberry Mount 7000 ft. high, and Guide Mountm 5500 ft. high. These are high mountains anywhere hot to mention being far under water.

One type of dredge being used are long cylinders of heavy steel mesh. These are dragged from the stern and bring up large pieces of rock, sand, ooze etc.

The San Francisco papers have been full of display articles about this deep sea work and it has very understandably appealed to the interest of the man on the street.

These dredges frequently bring up as much as half a ton of mud, rocks and shells. One photograph before me from the San Francisco Call-Bulletin shows Dr. Follett and Dr. Hanna of the California Academy studying a tray of specimens just brought up from 2,400 ft. Of course, the geologists are as interested as the zoologists because they have learned facts about new faults, and it was an item of genuine interest to them to dredged lava from those submarine mountains proving their volcanic origin.

It is needless to comment that this work will result in a host of species new to science not only in Mollusca but in other groups.

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We are indebted to Mr. Allyn G. Smith for the stack of clippings from the San Francisco newspapers about this work.

MINUTES 100
MAY 1950
CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA

Subscription $2.50 per year

We are now meeting the first Tuesday of every month at 7:30 P.M. at the Los Angeles Museum, Exposition Park, Los Angeles, Calif. All interested persons are cordually invited.

Please mail all news to your editor,
John Q. Burch,
1584 W. Vernon Ave.,
Los Angeles 62, Calif.
Telephone Ax 3-5710
Home phone Ax 2-7965

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CONCHOLOGY IN MY OWN BACKYARD

By Ernest N. Wilcox

About 10 years ago I came to live in San Luis Obispo. I do not drive an auto so my visits to the beaches were infrequent, but I found something of interest at home.

First there was Helix aspersa. On a foggy June morning I would go out with a tin can and from shrubs and tall plants, collect a pint of these mollusks, large and small. I emptied them in a pile on the ground and carefully mashed them with the end of a wooden 2 x 4. The next morning I would go out and again collect, just as many. I was interested in the brilliant snake-like spots and stripes of this mollusk.

During World War II Glen R. Webb- and there is a friend for you, sent me from France a number of specimens of Helix hortensis and they showed the same brilliant and diverse coloration. Since the name hortensis suggests that, like Helix aspersa, this snail spends part of its time on trees and shrubs, I have wondered whether this has any relation to its coloration. The strictly land snails with which I am familiar, mostly species of Helminthoglypta , have a rather dull, but fairly constant form. Three years

ago I visited western Oregon and collected many specimens of *Monadenia fidelis* . I found them high up on trees as often as on the ground and they were of brilliant coloring.

About 60 years ago Dr. L.H. Bailey of Cornell defined a scientist as " a person who sees what he looks at." That definition passed for a time, and then Dr. Charles Bessey of the University of Nebraska said " Yes, a scientist is a person who sees what he looks at, and then draws proper conclusions from what he sees." Dr. Bessey made the definition much stronger, and so I am not propounding any theory of snail coloration, from my limited observation. I merely pose a question.

I was interested in the breeding habits of *Helix aspersa*. I would find latge snails nearly buried in the ground and hovering a cache of 40 to 50 spherical, tough skinned, pearly white eggs. Incidentally, do snailologists need another personal pronoun in addition to IT, She or He, to denote both male and female condition in land snails ? With my limited vocabulary I found myself fumbling for a word.

During World War II I planted a Victory Garden, and then came *Helix aspersa*. By that time however, I had learned about the Unamerican activities of this pest and I had also learned about " Snailrol" so I spread the poison liberally. The next morning I went out to view the slain and among the dead and dying was amazed to see two fine specimens of *Helminthoglypta umbilicata*, and stranger yet, two specimens of *Helminthoglypta walkeriana morrosensis*. There was also another snail new to me, a rather small flat circular glossy brown fellow that Emery Chace identified as *Oxychilus draparnaldi*. Four different species in one haul.

Later on I was crossing the lawn one misty damp morning and picked up a wooden lath lying near a flower border. On the under side were a number of grayish specks, and when I put on my glasses I found these were snails the size of a pinhead. Dr. Wendell Gregg identified these microscopics as *Hawaiia minuscula minuscula* Binney, *Punctum conspectum conspectum* Bland, *Vallonia excentrica* Sterki, and *Zonitoides arboreus* (Say), so 4 more were added to my list of molluskan boarders.

Our backyard contained a goldfish pool but was without the usual water snails, so I introduced some wild species, *Physas*, two *Lymnaeas*, and a *Helisoma*.

The *Physas* promptly dies. The *Lymnaeas* survived the summer, but died during the winter. *Helisoma*, on the contrary, thrived and multiplied and now after nihe years is still in evidence. In summer their grayish gelatinous egg clusters are to be found on the under surface of water lilly leaves.

Some time later I became interested in the ground slugs. The grayish spotted bodies of *Deroceras agreste* were common on garden plants and under damp boards. I collected a number and dissected out the white flake-like shell plates that represent the undeveloped shells of ground slugs. Then one day I found two ground slugs as large and long as my little finger. They were gray with eliptical tan colored freckle-like spots and their horns were violet. The under side of the body was yellow. Nothing in Keep's " West Coast Shells" seemed to fit them so I sent them to Dr. Henry Pilsbry and he reported them to be *Limax flavus* . They have become quite numerous and destructive. Like *Helix aspersa* they hollow out a place in the damp ground an inch or more deep and lay 18 to 25 large oval gelatinous covered eggs. When newly laid they are a pale amber yellow but later on grow clouded and grayish in color.

At each end of the oval egg is a delicate point that often unites 6 or 7 eggs together like a string of beads, but usually the eggs are placed in the hollowed out nest in a particular manner, folded back and forth like the bellows of an accordion. When the young slug inside the egg is sufficiently developed He-She eats off the gelatinous covering and emerges. The shell plate in this *Limax* rather resembles a fish scale. Another land slug that I found was *Milax gagates.* It was dark brown in color with a queer hump on its back and wavy lines along its sides which gave it a fish like appearance. Except for *Limax flavus* it is the only slug whose eggs I have certainly identified. They are relatively large and trans-parent like a small dew drop. It is also the only slug whose shell plate I had difficulty in finding. After 28 dissections, I finally found one and it was thick and more solid than most, res-embling a small fragment of brown egg shell. Thus far I have found but two specimens of *Milax gagates* that bore shell plates.

A fourth land slug Allyn G. Smith identified for me. It was *Limax marginatus.* At first I had considered it just a color form of *Deroceras agreste,* and that shows I had not " seen what I looked at", for the dark stripes along its back are quite different from *Deroceras.* The shell plates in *Limax marginatus* are much more like those in *Deroceras* but seem to be larger at certain seasons of the year than at other times.

And so the list of my backyard mollusks adds up to 13.

Against the more agressive of these snails I wage a constant warfare but there are always survivors, and the battle goes on. I have concluded that like the Red Queen in Alice in Wonderland, a conchologist must keep running faster and faster- to stay in the same place.

Helisoma tenue californiense Baker
Hawaiia minuscula minuscula Binney
Punctum conspectum conspectum Bland
Vallonia excentrica Sterki
Zonitoides arboreus(Say)
Helix aspersa Muller
Helminthoglypta umbilicata Pilsbry
Helminthoglypta walkeriana morrosensis Hemphill
Oxycheilus draparnaldi Beck
Deroceras agreste Linne
Limax flavus Muller
Limax marginatus Muller
Milax gagates Draparnaud

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Mr. and Mrs. Albert B. Bronson send an interesting letter from Guam.

" Just received the March Minutes which we have devoured like mail from home. We had a Catholic Father over this evening. He is very interested in shells and especially in having them collected for market. These islanders in the outlying groups have almost no means of making cash money and they are eager to develop any industry. These padres have changed my deep grained aversion for missionaries into a deep and lasting admiration. They serve as a strong wise father to these people and shield them from the devastating impact which covilized contacts bring. They also are sincere in their affection and desire to help these unfortunate people become adjusted. However, the islands still operate on a bamboo economy.

The island of Kapingmarangi which was mentioned in the last National Geographic Magazine lies in Father Castigan's territory. He tells me they have some *Cypraea aurantia* and *Charonia tritonis* is quite common. I have seen several of the latter, beautiful specimens from 12 to 18 inches long and not eroded. Also the pink, red, yellow and orange gorgonians are very plentiful there. I am giving him a book on shells and will have him send in representative collections of *Conus* and *Cypraea.*

There are 1400 inhabited islands in the Trust Territories so there should be some interesting things turn up. I expect it will take at least two more years to get well organized but will start sending samples before the summer is over.

Had two nice *Conus amadis* Chem. turn up from the other side of the island. It may sound funny but I've been here nearly three years and have only been on the other side of the island a couple of times, once when sponge diving for Dr. DeLaubenfels and once with Y. when it rained all day and the water was dirty. So you see I still have 15 or 20 years to put in right here on Guam.

I wonder if I told you about D. Anderson, entomologist for Catholic University, bringing me a *C. Vicarius* from Martlochs. I have a feeler out to see if there are any more or if this was just a coincidence. Is this a very rare shell as Webb says ?

Certainly liked the treatment of the *Cypraea* in the last Minutes. Know a woman who swears she saw a *C. moneta* swimming along flopping its mantle like a sting ray and when she grabbed for it, it settled to the sand and she picked it up. This must be true because I saw the moneta.

THE SOCIETY OF THE LOST OPERCULUM

Mr. and Mrs. Bronson write from Guam " We are pretty indignant about not being able to enter the Lost Operculum contest, so we are going to end it all by supplying the Lost Operculum. If you take it to the next meeting, I'll send three choice *Conus* to the first person who can identify it without taking it out to compare of course. The winner can name his choice of cones and I'll try to supply them C. gloria maris excluded. "

And sure enough the Lost Operculum is on hand in fine condition and will be on display at the next meeting of the club June 6th. But, of course, this is only open to members of the Los Operculum Society so if you wish to compete for this prize it is suggested that you get busy and measure some of your shells and turn them over to Dick Mayhew before at at the beginning of the next meeting.

The editor is automatically barred from competition because he has been told and must therefore act as judge.

If this department is to continue to be of interest our members will have to support it by sending in their measurements. Many promised to send in those measurements of the biggest yet but have failed to do so. Please take a few minutes off right now, measure them and mail the results to Dick Mayhew, 1648 S. Genessee St., Los Angeles 35, Calif.

It is hardly fair to expect Dick to visit you and take the measurements personally.

J.E. Fitch
* Tivela stultorum Mawe, Pismo Beach 176 mm L.
Miss Joan Corbell
* Haliotis kamtchatkana Jonas, St. of Juan de Fuca 140L x 98W x 50D
Mrs. George Bengston
Panope generosa Gould, Henderson Bay, Wash. 187L x 108 H
Protothaca tenerrima Carpenter, Vaughn Bay, Wash. 117L x 85H
Schizothaerus nuttallii Conrad " 206L x 139H
Geo. P. Kanakoff
Crepidula princeps Conrad, Edison Bldg. Pliocene 82L x 59W
Crucibulum spinosum Sowerby Guaymas 50: x 46W
Littorina varia Sowerby Mazatlan 39L
Natica aleutica Dall Kodiak Id., Alaska 41L x 36W
Neptunea pribiloffensis Dall Wrangel Id., 101L
Opalia varicostata Stearns M. Plioc. Pac. Beach 90L
Purpura patula pansa Gould Mazatlan 80L
Tegula funebrale A. Adams Bolinas, Calif. 45L
Tegula regina Stearns Santa Barbara Id. 42L x 50W
Thais biserialis Blainville Mazatlan 65L
Thais lamellosa hormica Dall Wash.Bay, Alaska 69L
Turritella goniostoma Valenciennes Guaymas 86L
Captain W.S. Bitler
Conus pyriformis Reeve Venado Beach,Panama 136½ c 86½
Cypraea cervinetta Kiener Paloseca Beach,Panama 105L x 52½W

****

Mrs. Margaret Teskey sent in the following verse with the note that it was read by Mrs. Robertson at the last meeting of the Buffalo club, remarking that she has been doing so at intervals for over 50 years.

(From the Observer Magazine of August,1894)

A SHELL CRANK

By her suffering husband, C.M. Drake, Tacoma,Washington.

There are some bewitched by flowers, there are others daft on rocks,
  And bugs have crazy votaries by the score;
But the worst of all the evils that escaped Pandora's box,
  Has appeared to vex our once PACIFIC shore.
      The shell-craze is my theme;-
      That weird uncanny dream,
      That mania which never lets you go.
      That distemper of the brain
      Which has made my wife insane
      And transmuted all my happiness to woe.
  She sits by the parlor fire, and calmly read Josiah
    Keep's description of some Latin-labelled shell,
  While her husband makes the tea,
    And in lonely reverie
  Mutters epithets it wouldn't do to tell.

When last night I found sea-urchins lying thick upon my bed,
  And *Tapes staminea* on the floor,
With a *Bulla nebulosa*, where I used to lay my head
  Do you wonder that I mildly,mildly swore ?
      Must I never make a fuss
      When I dream of *Octopus*

Or of finding *Serpulorbis* in my boots ?
Must I jump up in the night,
Step on star-fish, strike a light,
Just to hunt up some obscure old Latin roots?
She sits by the parlor fire, and calmly reads Josiah,
While her lonely husband makes the toast and tea;
She classifies her shells, and their barbarous names she tells,
But she never, never, never thinks of me.

Her heart's become a *Cardium*, her teeth *Dentalia*
Her ear is *Haliotis rufescens*
Our house is *Saxidomus*, the grove is *Dentronotus*,
And her bonnet, *Calliostoma splendens*.
Dollars now she calls *Scutellae*,
Names the olives, *Olivellae*,
And her comb is *Pecten aequisulcatus*:-
So with sea weed in my hair,
Lord, forgive me if I swear,
It's her fault if I've become a *Sulcacus*;
For by the parlor fire she sits with her old Josiah,
While I must drink my solitary tea,
Her Latin names she tells, as she classifies her shells,
But she never, never, never,thinks of me.

Oft she dreams about the sea, with Josiah on her knee,
And a *Chama exogyra* ' tween her lips',
The tide book oft she scans, and voyages she plans
To each shore where *Argonautae* sail their ships
Oh! could we only go
To some spot where shells don't grow,
Perhaps this awful craze would pass away.
I would shell out any sum
If the time would only come
When I should not have to see her day by day
Sitting by the parlor fire, calmly reading her Josiah
While I swallow my resentment with my tea,
As she classifies her shells, and her Latin jargon tells,
But she never, for one moment, thinks of me.

****

New Publications Received

Report of the Committee on a Treatise on Marine Ecology and Paleoecology. 1948-1949 Harry S. Ladd, Chairman, Vice Chairmen Gordon Gunter, for Biology; Kenneth E. Lohman, for Geology, Roget Revelle, for Oceanography. National Research Council. 121 pages containing many interesting reports.

Recent Species of the lucinoid pelecypod Fimbria by David Nicol Journal of the Washington Academy of Sciences, March 15,1950. This is a well written and well illustrated report on this genus.

Circulares Del Museo y Biblioteca De Malacologia De La Habana- Editor: M.L. Jaume, 13 No. 351, Vedado, Habana, Cuba.
The March issue of pages 287 to 306 Inc. is at hand and is as usual full of interesting news to all. The price is $1.50 per 100 pages and is very much worth while.

Turtox News, June,1950 offers some interesting molluscan slides .

MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA-May 2

The meeting was called to order by the president Mr. George Kanakoff at the usual time. Members and guests were welcomed, and guests introduced. The minutes of the previous meeting were read and approved. Miss Vera Von Block and Davis packard were introduced by Mr. Kanakoff. Mrs. Burch introduced her guest Mrs. Virginia Faine of Avalon and Mrs. Ora Willett. Mr. Gillis and our former secretary Mrs. Gillis were given a hearty welcome.

Mrs. Chace reported for the nomenclature committee on the last issue of the Nautilus. Field leader Mrs. Burch, announced the field trip to be held May 7 at White's Point, San Pedro.

Due to the fact that the first Tuesday in July is July 4th our regular meeting night, it was moved by Mr. Schick that our July meeting be held at the usual time and place but on M July 3. Seconded and carried.

Mr. Grau introduced the speaker of the evening Mr. John E. Fitch of the California Fish and Game. Mr. Fitch gave a very fine talk enjoyed by all. The wealth of information on this mollusk was an inspiration and we look forward to seeing it in print.

****

Mr. L.B. Howsley, of Sunderlin,Oregon died April 24th. Mr. Howsley was interested in shells and made some study of them but his first love was without a doubt ornithology. He was a friend and associate of the late George Willett.

****

Miss Mirian Shepard, Portland, Oregon advises that she will be one at least from this coast to attend the A.M.U. meeting in Chicago. She will stop at the Palmer House.

****

We have a newspaper clipping showing a map and pictures of the dredges etc. being used to cut the opening from Mission Bay, San Doego county to the ocean. Mission Bay is to be made into a fine yacht harbor.

I can think of many species that I have taken only in Mission Bay and naturally wonder what effect this opening is going to have on the fauna. It will be interesting to observe.

****

Treasures of the Sea, 238 Biscayne Blvd., Miami 32, Fla. is the name of Ted Dranga's shop. His clever advertisement on the desk, Lucky Shark Tooth from a shark caught in the Gulf stream with an actual shark's tooth glued to the card.

Ted always has fine shells and other interesting things. Wish I could drop in for a visit.

****

Walter Webb's " Conchological Chatter" for May 1950 is at hand in which Mr. Webb offers a long list of fine shells.

******

We have the minutes of the March meeting of the conchological section of the Buffalo Museum. Pictures of sea and land creatures in their natural habitat against a background of beautiful Nova Scotia and the Gaspe Penninsula were much enjoyed.

Members had been asked to respond to the observation poll (a regualr feature) with a brief dissertation on " My favorite Bivalve and Why". Several illustrated their choice with specimens which were passed for scrutiny, and many different reasons were given for preference of this species or that.

MINUTES 101
JUNE 1950
CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA

Subscription $2.50 per year

We are now meeting the first Tuesday of every month at 7:30 P.M. at the Los Angeles Museum, Exposition Park, Los Angeles, Calif. All interested persons are cordially invited.

Please mail all news to your editor,

John Q. Burch,
1584 W. Vernon Ave.,
Los Angeles 62, Calif.
Telephone Ax 3-5710
Home phone Ax 2-7965

****

The following excerpt from a personal letter of Allyn G. Smith, California Academy of Sciences is sincerely appreciated:

" To the Conchological Club of Southern California, and to John Q. Burch, Editor, congratulations on the issue of Minutes No. 100! The publication of one hundred issues in almost as many months- over eight years- should be a matter of great satisfaction to the Club. This is a record of some kind for publications of this sort that is devoted to a narrow specialty and is all the more striking as many of those eight years were busy war years. The high quality of the Minutes has well merited the interest that has been shown in them, not to mention its broad circulation. They fill a real need among Western conchologists, malacologists,paleontologists and just plain shell collectors. So my personal thanks for a past job well done, together with my hope that the Minutes will remain healthy and active, and that the host of us interested enough to look forward to each new issue as the next hundred rolls off the duplicating machine will not be dissapointed."

MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA-June,1950

The C.C.S.C. met Tuesday, June 6,1950 in the Lecture Hall of the Educational Department of the L.A.C.M. with twenty one members present. The president, Mr. George Kanakoff called the meeting to order and welcomed members and guests. Miss Vera von Block and Mr. Dave Packard had their applications for membership read. Mr. Arnold G. Johnson was welcomed as a new member. Mr. William Church was welcomed home after spending a year in the east.

The Minutes of May 2nd were approved as published in the Minutes.

The date of the July meeting was again discussed. It was moved by Mrs. Mayhew to meet July 5 instead of the regular first Tuesday, July 4 or July 3 because of the fourth of July activities. Seconded and carried. The secretary will send notices to those who are not subscribers to the Minutes.

Dick Mayhew reported for the LostOperculum Club. He is grateful for the interest shown.

John Q. Burch, custodian of the Lost Operculum itself as claimed by Mr. and Mrs. Albert B. Bronson of Guam who sent it, placed the disputed object on display on the president's table, and all members were invited to examine it and attempt to name the species from which the operculum was taken. The Bronson's has promised to send a prize of 3 rare *Conus* to the person who first guessed the correct species. But the Bronson's won the prize themselves because no member of the club could place the operculum of the large *Murex ramosus*. One or two of the members placed it as a *Murex* operculum but failed to recall the species.

Mr. Gilbert Grau, program chairman then presented Mr. Morris Caruthers who gave an interesting paper on a collecting trip to Trinidad, California. The paper will be found following the minutes. Mrs. Elsie Chace gave an illustrated talk on chitons, throwing the view from the actual mounts on the screen. A general discussion followed.

The meeting adjourned at 9:45 P.M.

Mrs. John Q. Burch, Secretary

****

A Collecting Trip to Trinidad, California

By Morris Caruthers

In june of 1926, at the end of a collecting trip along the coast north of San Francisco , we were in the vicinity of Trinidad, Trinity County and while the best tides were over, we stopped over for one tide as Eric Knight Jordan's pamphlet on the shells of Trinidad had been recently published by the Smithsonian Institution and I was interested in the shells from that region.

We intended to try to find the location where he had worked, but as the whaling station was operating and quite a number of whales had been brought in and the factory was working full blast, with the extremely offensive odor blanketing the surrounding country, decided we could not stand it, so we found a spot where we could camp about two or three miles south of the town and spent the night there. We still had some of the odor with us but not too much to stand.

We camped just off the main road, a beautiful spot, about 100 ft. above the ocean, with a gentle slope of pasture land down to the water's edge.

A small stream crossed the road and flowed down through this pasture to the ocean. It was shaded and among the rocks along

the stream we took *Monadenia fidelis*, *Polygyra columbiana* and *Haplotrema*. These I collected on my way down to the ocean.

I found that the cove at the foot of the pasture was a sand beach, the same black sand that Jordan mentions, found very few turnable rocks, but there were masses of very large rocks sticking out of the water and between the tide lines. They were all very hard and smooth volcanic rock with very few crevices, but all covered as high as the tide came up with seaweed. Most of my collecting was done on the sides of these rocks- in some cases I was walking around up to my waist in water, and it was not our warm, southern ocean water edther.

There were a few turnable rocks and I think I turned over every one of them. Very small shellssuch as *Odostomia* did not show up on any of the rocks I turned.

Three species of bivalves were found, *Paphia*, *Hinnites* and *Kellia* ten species of chitons including the big *Cryptochiton stelleri* which as Jordan says was very common. I did not collect any specimens as it is so hard to prepare and I had already taken plenty of them in San Luis Obispo County.

Probably the most interesting find for me was the brachiopod *Terebratella transversa* , which I had never before seen alive. They were on the sides of the largest rocks at just about the lowest spot, were fastened singly and standing out just like you see the shelf fungi on an old log. I did not count the number of specimens I took but I believe there were about 75 or 100 specimens. The tide was not too low and probably if it had been a 1 foot minus tide I would probably have been able to get a great many specimens.

All told I took about 41 species of marine shells practically all taken alive. No abalones were noticed although *H. wallalensis* occurs a short distance to the north. *Purpura foliata* was found, again agreeing with Jordan that they were not very good specimens.

Jordan lists 67 species collected of which 7 species were beachworn or broken. 15 species on his list were either microscopic species or juvenile. He also spent five tides collecting while I had only one to work.

I have always wanted to return for more collecting but to date have had no opportunity.

Shells Collected Two Miles South of Trinidad, California
June 1926

Terebratalia transversa Sby.
Acmaea incessa Hinds
" asmi Midd.
" pelta Esch.
" instabilis Gld.
" mitra Esch.
Crepidula nummarius Gld.
" adunca Sby.
Mitrella carinata(Hinds)
Amphissa columbiana Dall
Bittium eschrichtii Midd.
Thais lamellosa Gmelin
" emarginata Desh.
Pterorhytis foliata (Gmelin)
Searlesia dira Reeve
Ocenebra interfossa Carp.
" circumtexta Stearns
" lurida Midd. (con.)

Lacuna compacta Carp. ?
Littorina scutulata Gld.
Opalia chacei Strong
Trimusculus reticulatus (Sby.)
Olivella biplicata Sby.
Margarites lirulata Carp.
" pupilla Gld.
Calliostoma dolarius (Holten)
Tegula brunnea Phil.
" funebralis A. Adams
Protothaca staminea Conrad
Hinnites giganteus Gray
Kellia laperousii Desh.
Cryptochiton stelleri Midd.
Mopalia lignosa Gld.
" hindsii Sby.
Katherina tunicata (Wood)
Ischnochiton mertensii (Midd.)
" cooperi Pilsbry
Tonicella raymondi Pilsbry
Placiphorella velata Carp.

Land Shells
Monadenia fidelis Gray
Polygyra columbiana
Haplotrema vancouverensis

****

The following clipped from Vincent Starrett
" As for myself, " wrote Edna St. Vincent Millay, in her foreword to Karl Yost's bibliography of her published works," I am a collector of sea shells. I live in the strong tho ebbing hope of finding some day on a briefly uncovered sand bar a righthanded Lefthanded Whelk; or even, someday, after propitious fould weather, of digging out of the beach under the jealous eyes of hundreds who dare not quite attack me and wrest it from me, a perfect Junonia. The very thought of the words " Conus gloria-maris Hwass" fills me with an ectasy of longing and despair. But the sight of the words ' matchless copy of Hooke's Amanda, with both blank leaves G and H' leaves me unaffected."

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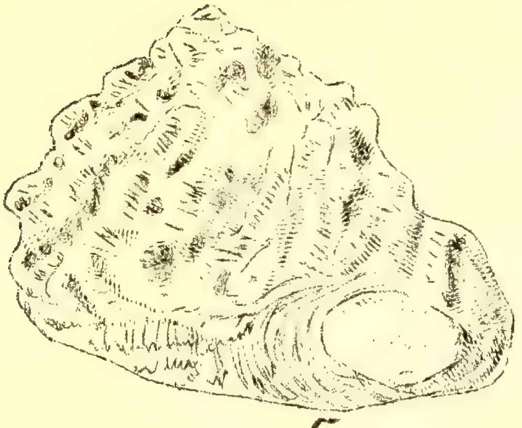
Note from Allyn Smith" The Academy has done no recent off shore deep water work as the " Mulberry" has been ordered to Puget Sound for the summer and is not expected back until the middle of Augutst It is hoped that operations can begin again in September. I have saved, or will try to save a week of vacation so I will be able to make at least one trip with her this year."

****

Robert J. Drake, Museum of Anthropology, University of California, Berkeley 4, Calif. Bob has been teaching at the San Mateo Junior College and the above will be his address after July 1.
Dwight W. Taylor, Museum of Zoology, Ann Arbor, Mich. Dwight is spending at least a part of the summer in the field with a paleontological party working in Kansas and Wyoming. He expects the experience to be of great value to him.
Walter J. Eyerdam, Seattle, Wash. Walter left for the Herring fisheries of Alaska June 8th and will not rerurn to his home until fall. Of course, he will make his usual interesting collection.



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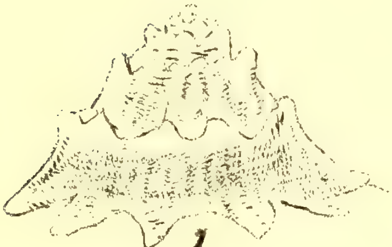

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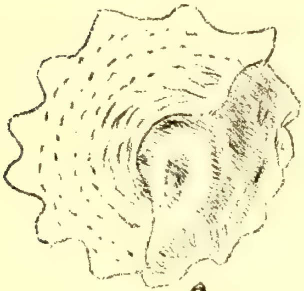

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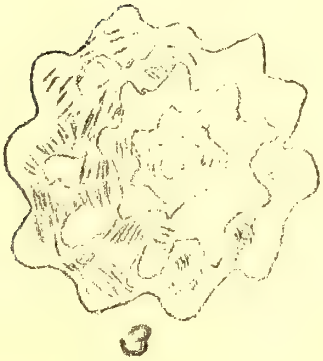

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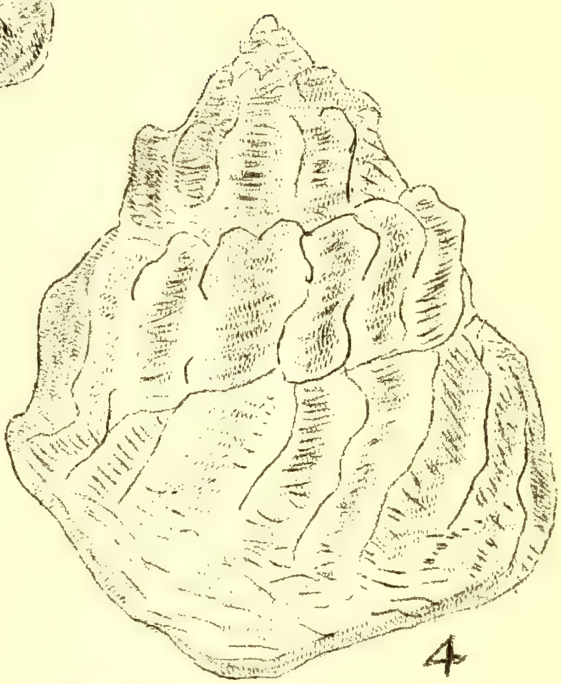

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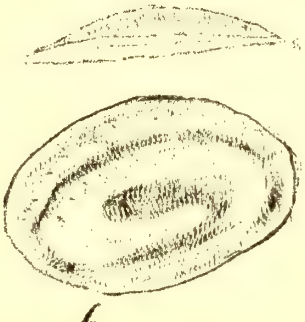

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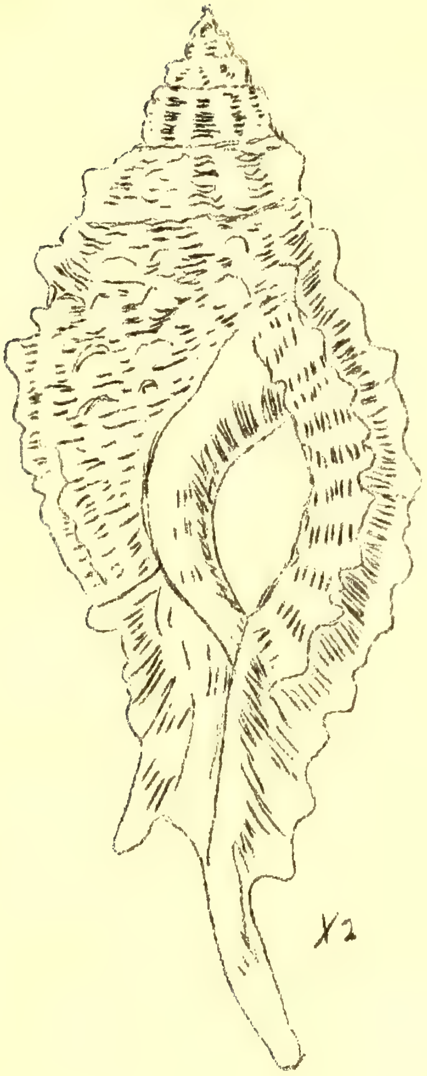
Astraea tuber dominicana New subspecies



Murex pulcher consuela New subspecies

New Subspecies from the [illegible] West Indies

By A. Hyatt Verrill

Murex pulcher consuela New subspecies. This beautiful shell comes nearest to M. pulcher but differs from that species in the type of sculpture, the form of the canal, curve of the " tail", the form of the aperture and the proportions of the shell, as well as in the entire absence of spines, the coloration and the thin, fin-like extensions of the varices.

Shell with three equally spaced varices, each with a thin fin-like extension for about one half its length or more. Varices and upper surface of posterior portion of last whorl with strong, rounded, concentric ridges alter-nating with smaller ridges. Each whorl between varices with three rows of rounded nodules connected by slightly raised concentric ridges. Aperture elliptical, slightly oblique. Siphonic canal broad with incurved sides for about half its length, and extending into a slender, sharply upturned " tail". Color of all shells is pale rose to salmon pink with tips of nodules on body deep red, these color areas often extending for a short distance along the connecting ridges and forming blotches of deep red on the varices. Each whorl with two bands of brick red, one near the top, the other at the bottom of the whorl, and often more or less interripted between the varices. Interior of aperture pale violet. Nucleus and first whorl deep rose. Operculum deep brown, horny.

Size: Length 57-65 mm. Diameter 29 to 34 mm. Taken in 40 to 50 fathoms off Soufriere, Dominica, B.W.I. Fifty specimens, all caught in traps on rocky bottom. Type in collection of the author. Named in honor of my grand-daughter Consuela (Conchita) Cintron, the famous bullfighter.

Astraea tuber dominicana New subspecies. A much heavier and more pyramidal shell than typical A. tuber L. Whorls strongly ribbed, often with conspicuous nodules at shoulders and with strong concentric ridges between the ribs. In many specimens the second and third whorls are swollen and larger than last whorl. Sutures very distinct, giving the shell the appear-ance of a coiled tube. Immature specimens often very spinose, closely resembling Astraea imbricata in appearance. Operculum very different from that of A. tuber L. being deeply sculp-tured and with a broad flattened margin. Color very variable but always richer and heavier than in A. tuber. As a rule the predominating color is vivid verdigris-green with blotches of brown, red, black or ocher and zig-zag markings of brown or red. Often almost entirely red. Base heavily mottled or streaked with red. Collected at St. Thomas, Tortola, and Dominica. Size of type: Height 2½ inches. Diameter 2¼ inches. Others as large as 3" in height and diameter.

THE SOCIETY OF THE LOST OPERCULUM

Walter J. Eyerdam

* Acmaea patina Gould	Afognak I.,	50 w x 631
Beringius kennecottii Dall	"	141 L
" stimpsoni Gld.	Icy Cape, Alaska	36 W x 44 L
* Neptunea tabulata Baird	St. of Juan de Fuca	112 L
Panomya tuggida Dall	Seldovia	50 W x 90 L
Piliscus commodus Midd.	Pribiloff I.	23 x 28
Puncturella multistriata Dall	"	30 W x 39 W
* Spisula alaskana Dall	Cordova I.	98W x 136 L
Siliqua patula Dixon	"	74W x 170 L
" alta Brod. & Sby.	"	70 W x 130 L
* Thais lamellosa Gmelin	Kuiu I.	90 L

Robert O. Fox

Acmaea mitra Esch.	Fort Ross, Calif.	44 L x 39 W x 31 H

Gilbert Grau

* Plagioctenium circularis aequisulcatus Carp.	Newport Bay, Calif.	85 W x 96 L

H.W. Miller

* Fasciolaria princeps Sby.	Culebra Bay	266 L
* Mitra attenuata Reeve	Tambor,Costa Rica	98L x 26 W
Mytilus adansianus Dunker	Boca de Barranca, C.R.	53 L x 34 W
Adrana suprema Pilsbry & Olsson	Tambor, C.R.	72 x 16
Arca grandis Brod. & Sby.	Puntarenas, C.R.	127 L x 114 W
Chione asperrima Sby.	Tambor, C.R.	55 x 47
Macoma grandis Hanley	"	85 x 63
Mactra velata Philippi	Puerto Soley, C.R.	116 x 85
* Malea ringens Swainson	Tambor, C.R.	190 x 145
Periploma planiuscula Sby.	Boca de Barranca	47 x 29

Mrs. Rose Burch

Astraea undosa Wood	San Onofre, Calif.	122 L x 125 W

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Professor Trevor Kincaid, Nahcotta, Wash. " Till about the first of September I will be at this point where I am in charge of the laboratory maintained by our department of fisheries at this point. Except for oysters and several species of clams this bay is quite devoid of Mollusca. However, I did run into a few Alvanias a few days ago which I had not seen previously in these waters. I also came across a small dark colored opisthobranch crawling over the sand which was new to me. This species has a very interesting internal shell of which I will send you some specimens , as these will be ' shells' which will probably be new to your collection. They belong in the class of micro-mollusca.

I am now engaged among other things in studying the life histories of the local bivalves. To get at the sculpture of the microscopic larvae I clear them in Purex and then mount them in balsam. They make very interesting and characteristic microscopic specimens"

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Congratulations to Mr. and Mrs. John D. Dorr Jr. , Frederick, Maryland. Mrs. Dorr is the former Miss Betty I. Klein. Both Mr. and Mrs. Dorr are active students of conchology.

****

Miss Ruth E. Coats ,Tillamook, Ore. writes of her plans for deep water dredging this summer. Wish we could go along.

Dr. R. Tucker Abbott of the United States National Museum is enjoying some real collecting. We have a card from him dated June 2 from Zanzibar, Africa " Two weeks collecting in fabulous Zanzibar and a month along the rich coral shores of Tanganyika and Kenya have convinced me that its hard for a malacologist to remain sane in the face of tons of extraordinary shells. One night's collecting at Bungi, Zanzibar produced 500 *Cypraea caurica*, 200 *C. lynx*, 20 *C. onyx*, 45 *C. vitellus*, 12 lamellibranchs. In front of my abode are thousands of 2 inch long *Bulla ampulla*. Out here the problem is not finding the shells, but the containers to put them in. Wish you were here. Off by air next to Cairo, Calcutta, Singapore, Manila, Guam, Hawaii and home by June 21."

****

Donald Melvin Wilson , one of our most active young members is entitled to a big hand. Of course, we are very proud of Don and are not surprised to hear that on his graduation this month from the John C. Freemont High School, of the six special awards Don won three of them, the Alumni Association Award, The Science Award-Bausch and Lomb Medal and the Readers Digest Honorary Subscription Award.

And in conclusion Don has been given a full scholarship to the University of Southern California.

****

Mrs. Harrison Smith, 803 Weightman Bldg., 1524 Chestnut St., Philadelphia 2, Pa.

We were humiliated to discover that we failed to list Mrs. Smith in the 1950 Directory although she has been for many years one of our most enthusiastic students of conchology and has one of the finest collections including many of the genuine rarities.

****

Mrs. Ralph Bormann sent us the following taken from the Sunday Long Beach papers.

" The Romance of Shells" is the theme of an exhibit to be shown in the upstairs exhibition hall of the Long Beach Public Library, June 18th through July 8th.

The exhibit is sponsored by the Long Beach Shell Club with Mr. and Mrs. Harry R. Turver and Mr. and Mrs. H. Arden Edwards, members of the group responsible for the display.

Mr. Harry R. Turver is an oil geologist with the Stanfard Oil of California and Mr. H. Arden Edwards is on the staff of the Southwest Museum of Highland Park, and is a well known artist for his work both in oils and water colors.

The exhibit is specifically designed for the general public . The material to be shown will embrace a wide variety of subject matter such as " Shells from the seven seas", Shells with an economic significance, Shell artifacts used by prehistoric man, Shells from the Gulf of California with a painting of beautiful Boca Chibampa Bay by H. Arden Edwards.

Rare shell money from the Southwest Coast, cloth dyed from the mollusk, *Purpura patula*, from Mexico and hundreds of other interesting items.

The Long Beach Shell Club is one of the outstanding groups of conchologists in the west. Meetings are held the second Sunday of each month (except July and August) at the Long Beach Public Library.

The Long Beach Shell Club is widely known for its recent publication " Shells and Shell Collecting" a book by members of the group.

New Publications Received

Spawning and Development of Some Hawaiian Gastropods by Jens Mathias Ostergaard, Pacific Science, April,1950.

This is a very interesting paper of some 41 pages and 42 text figures. In connection with our recent discussions of the development of Cypraea Professor Ostergaard's paper is a very scholarly contribution.

Comparative Study of Mating in Two Species of Arionid Mollusks by Glenn R. Webb, Journal of Entomology and Zoology, v 42, no.1, 1950.

New and Neglected Philomycids and the Genus Eumelus Rafinesque by Glenn R. Webb, Transactions of the American Microscopical Society. A very fine paper- two complete plates.

Notes on the Coition and Feeding of the Blue-Tailed Skink by Glenn R. Webb, Copeia, Dec. 1949

Circulares Del Museo y Bibliotheca De Malacologia De La Habana Editor Miguel L. Jaume, 13th St., No. 351, Vedado, Habana,Cuba. The prices of these papers is $1.50 per 100 pages . These neatly mimeographed sheets carry an amazing amount of valuable data as well as current news of interest regarding persons and publications.

Another publication also to be obtained from Mr. Jaume is the Catalogo Molluscos De Cuba. Another supplement to this great work has just been received pp 601-650. When completed this will be a complete distributional list of all species known to Cuba, both land and marine.

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More about the Achatina fulica Fer.

After the many scare head reports about this snail it is of some interest to pick up another side of the story. In Wild Life (Australia), April,1950 there is an article entitled " Case for the Snail" in which the author states:

" I was very interested in your article about the giant snail (WL Feb. p. 59) because some 8 or 9 months ago I went to Rabaul with the express intention of writing something about the threat the snail represented" writes Olaf Ruben

I found there a great difference of opinion about the thing and came to my own conclusions (which prevented me from writing the article) from a study of the people whom I interviewed rather than from a study of the snail itself. So I rather hesitate to buy into the argument.

Those against the snail in Rabaul were mainly people who had not watched it. As you say, the snail is largely a garden scavenger. I have not seen it eating living vegetation- only dead or dying leaves and flowers; nor had any of my pet observers. Also, the direct sunlight killed it in a matter of minutes, as I could see for myself any early morning when the late feeders were caught in dozens, and died even when they were on the dew-wet grass.

You state, " The Japanese had brought them as a contribution to living off the land", yet none of the people I interviewed who had seen the Japs either before the end of the war or, as prisoners, after it closed, had ever seen a Jap eating the snails. They were exceptionally well provided for in Rabaul, and their gardens were better than anything Australians or Americans had,

so commissariat, in this instance, was a strong point with them. Remember, they were deeply entrenched.

" Quoting again, ' The Snails were brought from Japan alive, and set loose in the hope that they would multiply and provide sustenance for troops in the jungles.' That is possible but not likely. Did they think the snails would swim from island to island? Much more likely that they were carried , as to San Pedro, on war material. Anyway, as I've said, the Japs don't like them. The big fellows are beyond the power of a duck- they are at times too strong for a jeep to crush- but the little ones are just a gift."

* There is a great deal more to this article, and while there seems to be no question of the Achatina being a post, it does seem also that many of the reports have been greatly exagerrated.

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An illustrated article appeared in the Los Angeles Times of May 28, 1950 entitled " Beds of Abalone Thrive on Rocky Naval Island"

" Possibly the greatest abalone beds in the world exist at lonely San Nicholas Island, some 65 miles off the coast of Southern Calif. There abalone flourish as they did hundreds of years ago when they were the principal food of the channel island Indians, who made their homes there. Great beds of abalone stretch along the rugged rocky shores. In many instances the home of the abalone will be set deep in the sandstone rock, making it practically impossible for any enemy or anything to get it unfastened from the rock. Action of the waves wash the sandstone away and sink the smooth round surface beneath the abalone into the rock. Almost inaccessible by land because some areas can be reached only by a long hike over rugged and sandy terrain, the abalone are relatively safe from all but natural enemies. Rocky reefs offshore prevent marauders from taking them by boat. In addition these abalones on this lonely island enjoy the protection of State fish and game laws. Commercial abalone fishermen cannot take them because State laws provide that commercial men must use diving suits and can take abalones only in water 20 feet or deeper. Huge shelves of rock extending for miles along the beach at San Nicholas are covered so thickly with abalone that it is almost impossible to walk on the rocks without stepping on the shellfish. Sportsmen could get them if they were closer to land and if the Navy did not have jurisdiction over the island. The entire island, operated by the Navy, is closed to all persons except by special permit. But the Navy men stationed there get a real break if they like abalones.....

Fish and game officials of California believe that the wealth of food in the water, coupled with the fact that the San Nicholas abalone have grown for years virtually undisturbed, is responsible for the depth of the shells. ...

And so, until the Indians return or laws are changed, abalones will continue to make the rock shelves of San Nicholas Island resemble a cobblestone street. "

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Mr. Walter F. Webb in a personal letter recently told of the great catches of fine shells off Florida in the newly found shrimp grounds. It seems that rare Florida shells by the countless tons and thousands were brought in and among them were many great rarities including a Junonia measuring over 8 inches. The story went that the first finder sold it for I think $150, the buyer passed it along for a fine profit and the last heard of it was that it was purchased for $350. Too bad for our ' Lost Operculum Society' that we do not include Florida at this time.

MINUTES 102
JULY 1950
CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA

Subscription $2.50 per year

We are now meeting the first Tuesday of every month at 7:30 P.M. at the Los Angeles Museum, Exposition Park, Los Angeles, Calif. All interested persons are cordially invited.

Please mail all news to your editor,

John Q. Burch,
1584 W. Vernon Ave.,
Los Angeles 62, Calif.
Telephone Ax 3-5710
Home phone Ax 2-7965

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THE PISMO CLAM
by John E. Fitch

Mr. Fitch was the speaker at the May meeting of the Conchological Club and gave a very entertaining and informative lecture on the Pismo Clam. The July issue of California Fish and Game contains a very fine paper by Mr. Fitch on this subject. The paper is in 28 pages and illustrated by numbrous photographs, a genuine contribution to our knowledge of this mollusk.

The following is a brief abstract of Mr. Fisk's talk.

Scientific name literally means " foolish Tivela". Tivela named in honor of Tivel Adam in 1807. Common name taken from Indian word " pismu" meaning tar (deposits of asphalt in vicinity of Pismo Beach where clam is most popular). They are found on open sandy beaches from Halfmoon Bay to at least Magdalena Bay and reportedly from as far south as Socorro Island off the Mexican coast.

Color variations are many and patterns vary from solid to striped individuals. Sexes are separate and cannot be determined

without microscope. Typical detritus feeders and utilize dinoflagellates, diatoms, bacteria and other algae, minute 200 plankton, gametes of invertebrates, zoopores of algae and detritus from disintegration of plant and animal cells. A three inch clam filters some 5800 gallons of water a year. Growth is continuous throughout life and averages about 3/4 inch per year for first four or five years slowing down after that. Many clams mature and spawn at 1½ years of age (3/4 to 1 inch diameter). A five inch female spawns 10 to 20 million or more eggs 1/350th of an inch in diameter. Spawning takes place from May through December each year with spawning the year around possible on some colder beaches. Larvae free swimming for estimated 3 to 6 weeks then set in sand. Most clams in intertidal zone but do not range into water 80 ft, deep.

Mortality extremely high in larvae with but a microfraction of 1 percent ever setting. During first 7 years of life the clam undergoes a mortaility of 99.5 % with but 5 clams remaining of 1000 at the end of 7 years. Smallest clam collected by me was 2.3 mm in total diameter while largest clam on record is 187 mm.

****

Miss Edna T. Cook- was for many years a very active member of our club seldom missing a meeting. Her health has been poor for the past several years and has confined her to her home a large part of the time. She passed away easily at 7:45 A.M. July 13th.

Miss Cook and Mrs. Effie Clark worked together doing a great deal of work with the Pleistocene mollusks of the San Pedro area. She was an enthusiastic and serious student of the local fauna both Recent and fossil.

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Dr. Henry B. Watson, 151 Front St., Binghampton, N.Y. passed away on June 20th. Dr. Watson was one of those who seemed to enjoy all nature activities including a shell collection which he worked up originally from his winters spent in Florida.

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A Little Note on Etymology by the editor

Or is etymology a good word for this idea ? Pronunciation would be a better one. A few of our members come up with words that surprise your humble editor making him think that perhaps he should be demoted to the ' aint' class, but a common usage now seems to be to pronounce the word NOMENCLATURE with the accent on the second syllable emphasizing the sound " men". The query here is where did this come from and why ? The following English dictionaries give the only permitted pronunciation with the accent on the first syllable pronounced exactly as in " No"; Webster, Century, Funk and Wagnalls, Stormonth, Encyc-Dict.; Worcester. One other, the Oxford dictionary gives the preferable pronunciation with the others but is the only one that I could find that even mentions an accent on the second syllable. The Oxford does give it in second place as permissible.

Of course, it seems to be necessary in organizations such as the Conchological Club to simply state that members may pronounce words as they wish and no doubt have some authority for doing so. Recently one of our more learned museum curators was visiting when the word Modiolus came up. I pronounced it with the accent on the second syllable as ' die' and was corrected whereupon I simply pulled down Websters Unabrodged and showed the word as I used it. It left the professor still incredulous. Of course, I studied Latin and have forgotten all of it except perhaps the first line of Virgil. Odd how our minds retain the most useless things.

VOLUTA MUSICA, ITS FORMS, DISTRIBUTION AND OPERCULUM

By A. Hyatt Verrill

During the past three years I have had nearly five hundred specimens of Voluta musica and its various forms and have had an unequalled opportunity to study its distribution and its various named forms. Hitherto insufficient material has been available to enable conchologists to determine if all the named forms are valid, or even to adequately describe them, and very little apparently is known regarding the range and distribution of V. musica and its habits. The operculum, I believe, has never been described; very few conchologists have seen it and several of our most eminent authorities wrote me that they were not aware that Voluta musica had an operculum. This is not so very surprising for in the majority of cases the operculum is absorbed or cast off when the shell reaches the adult stage with thickened edge to the lip. Even in the immature and young stages the operculum is out of all proportion to the shell being very much smaller than the aperture. It varies somewhat in shape in the several forms but is always horny, elliptical, blunt or rounded at one end and sharpened at the other; rather thin, sculptured with faint incised lines, and varies in color from pale yellow to almost black, depending upon the color form of its shell.

In its habits Voluta musica is largely nocturnal, living on sandy or slightly muddy bottom at from 5 to 15 fathoms. During certain seasons of the year the shells congregate in immense colonies, probably for breeding. At one haul of one trap I obtained 157 specimens and from 50 to 75 in a trap were common. At other seasons the shells occur singly in shoal water while at other times they completely vanish for several months, probably going into deep water, although I have never taken a specimen in my traps at more than 50 fathoms.

FORMS AND DISTRIBUTION

Voluta musica musica. Cuba, Haiti, Puerto Rico, Dominican Republic, Vieques, Tortola. Easily identified by the pale buff or yellowish ground color, the clearly defined musical staff and large patches of dark brown; the brown nucleus, the sloping shoulders and low, often lacking, nodules at the shoulder of the last whorl. Interior white or pale buff.

Voluta musica carneolata. The most abundant form in the Lesser Antilles from St. John to Barbadoes. Although this varies considerably both in coloration and in size and development of the shoulder spines, it is easily recognized by the decidedly pink or salmon ground color, the rich orange nodules and blotches, the horn-colored nucleus, salmon interior and its stout " chunky" form. Also, the dark blotches on edge of lip are smaller and are more widely spaced than in other forms. The average size of adults is from 2-2½" but I have collected a good many over 3" long and one or two giants 4½-5". These however, are extremely rare. Among the hundreds of those shells I have collected there is one albino, an immature shell with operculum. It is a lovely shell, snow-white with faint " music" and small spots of pale lilac and purple. I do not think anyone has hitherto come upon an albino V. musica. It is a unique specimen and a true albino as the animal was almost colorless and the operculum is very pale buff.

Voluta musica thiarella. Montserrat, rare. Antigua, rare. Guadeloupe scarce. Dominica, common. Martinique, common. St. Lucia, rare Barbados, very rare. This handsome form is distinguished by its pink or pale flesh-colored ground color, red musical staff, absence of color markings on the shoulder nodules, bluish spots above and below these, the rich salmon or orange interior, the numerous columnar plications, (fourteen to sixteen) the orange -colored nucleus and the small, widely spaced few spots ont oh edge of lip. These are often absent. The spire is higher and more pyramidal than in true musica or musica carneolata and the shoulder nodules and raised ridges on the last whorl are more pronounced than in either of the foregoing forms. Although the West Indian specimens seldom are more than 3 inches in length I have received specimens from West Africa that were five inches and more. In all other respects the specimens from Affica are indistinguishable from those collected in the Windward Islands.

Voluta musica damula. St. Kitts, rare. Montserrat, rare. Dominica, scarce. Barbadoos, occasional. St. Vincent, not rare. Grenada, fairly common. This form is quite distinctive. The ground color is very pale buff or yellowish-white with faint, usually interrupted yellow or pale orange musical staff and with a few widely scattered dots of dark brown or blackish. Interior pale lilac. Fourteen to fifteen columnar plications. Blotches on edge of lip very small and pale and often absent. Nucleus very pale straw color. Strong longitudinal ridges on last whorl. Shoulder nodules very variable. A narrower shell than any of the foregoing forms.

Voluta musica plicata. Not found north of the Grenadines. The common form at Bequa, Cariacou, Grenada, Margarita. A much larger shell than any of the above forms. Average size of adults 3 to 3½" in length. Some specimens 5½ inches. Ground color very pale buff to almost white. Musical staff, small scattered blotches and numerous fine specks fawn color or pale orange-brown. Nucleus straw-color. Interior pale yellowish-white. Markings on edge of lip deep brown, arranged in pairs evenly spaced, slightly raised above surface. Columnar plications eleven. The only published descriptions of this form state that the longitudinal ribs are not nodulous at the sutures. In all the specimens I have obtained the nodules or spines are very conspicuous, much larger than in any form other than typica. The most reliable distinguishing feature of plicata are the conspicuous raised concentric plications extending around the lower portion of the last whorl.

Voluta musica laevigata. Tobago,Trinidad,Curacao. A very variable form. It may have a yellowish, greenish,brownish,grayish or dusky ground color. In most specimens the typical musical staff lines are very faint or lacking or are so interrupted by numerous blotches and zig-zags of deep brown or blackish that they are indistinguishable. Interior lilac. Columnar plications small, eight to ten. Spire elevated. Little or no trace of nodules at shoulder of last whorl. Nucleus darl horn color. Many specimens appear almost uniformly dusky, others very closely resemble Voluta virescens, while still others are colored in much the same manner as Voluta ebraea. A much more elongated shell than most of the other forms. Average length of adults 2½ to 3 inches.

Voluta musica typica. Bequa, Grenadines, Margarit , Aves Is., Carupano, Venezuela. This fine large form appears to be restricted to the coast of Venezuela and the islands off the coast and the outlying Grenadines. It averages larger than any other form, usually 4 to 5 inches in length and often larger. Adult specimens under 3 inches are not found. Easily recognized by its large size, sharp, conspicuous spinose nodules, and coloration. The ground color is straw color or buff with the " staff", numerous irregular blotches, innumerable small dots and longitudinal wavy lines of orange and brown, often overlapping. Dark markings on lip in pairs, large, conspicuous and raised. Six to nine columnar plications. Nucleus brown. A very broad, stout " squatty" shaped shell.

Voluta musica polypleura. Grenadines, Curacao, Tobago, St. Vincent. I question the validity of this form. Specimens show a perfect series of gradations from V. musica laevigata. The total absence of the " staff" lines is not constant, some specimens having portions of the lines, others complete but very faint lines, others only one set of the lines. Proportions of the shell much the same as laevigata. Average size 3 to 3½ inches in length.

Voluta musica guineensis. West Africa, Margarita, Grenada. A large form, adults averaging about 3 to 4½ inches in length. Ground color ochreous or pale orange. Aperture dull yellow. 10 to 12 columnar plications. Longitudinal ribs scarcely indicated. Shoulder nodules low, obtuse, rounded. Spire extended, pyramidal. Large heavy, dark-brown blotches and smaller dots scattered over the entire shell, often joining to completely conceal the " staff" lines. Many small deep orange spots on edge of lip, not raised. Some specimens have a pinkish cast but the numerous heavy brown blotchesa are very distinctive.

Voluta musica sanguinea. (New form) Four specimens from the Grenadines (Bequa and Cariacou). A small form, the largest adult (type) is barely 1 3/4 inches in length. A rather elongated shell with extended spire. Nine to ten stringly defined, rather broad longitudinal ribs extending to suture with scarcely more than an indication of nodules at shoulder. Nucleus orange. Eight to ten columnar plications. Ground color pale salmon or deep flesh-color. Musical staff, as well as innumerable dots, rich orange. Large reddish-orange blotches on each rib interrupting the con-centric lines. Another row of orange-red blotches at suture. No dark colored markings anywhere. Interior of aperture and callous dull orange. No markings on edge of lip.

Voluta musica ornata (New form) Three specimens from Bequa Island. Length of shell adult (type) 3 inches, greatest diameter 1½ inches. A very slender form with high spire and unusually strong columnar plications varying from ten to twelve in number. The sharply upturned " tail" typical of other forms of musica is lacking in this shell. The longitudinal ribs are very broad, low and extend to the suture with a very slight indication of nodules at shoulder. Nucleus brown. Ground color pale rose-pink. Each of the low ribs has a large grayish-blue irregular blotch bordered with brown covering the musival staff lines, near shoulder of last whorl. A similar row of blue, brown-bordered blotches on the lower concentric lines. Many scattered reddish-brown spots unevenly distributed over the entire surface. Interior of

aperture pale pink. Callous and columella very pale bluish. Eight to ten heavy brown blotches, often in pairs, on edge of lip. This is a very distinctive form differing from all other described forms in its elongated, slender shape, the absence of the upturned extremity of canal and the coloration.

Apparently several of the recognized forms of this shell are geographical races while others may be merely color varieties. Also, of course, where two or more forms are found together there would be some interbreeding and we might expect to find every variety of color and shape common to the several forms inhabiting the area. This is the case with the specimens from Barbados, Domonica and several other islands. A great many specimens from these localities are neigher definitely thiarella nor carneolata. The coloration is intermediate between the two, some have prominent ribs and nodules at shoulders, others have no nodules and scarcely distinguishable ribs. In a large series of shells from these islands there is every gradation from typical carneolata to equally typical thiarella. I have never yet found a specimen that is intermediate between damula and other forms. Plicata and typica appear to be distinct subspecies and in many respects polypleura comes nearer Voluta virescens than to any of the forms of musica.

My new form, sanguinea is very distinctive in color as well as in form and apparently is a dwarf form, while my ornata differs from all other known forms so greatly and in so many respects that it might well prove to be a distinct species.

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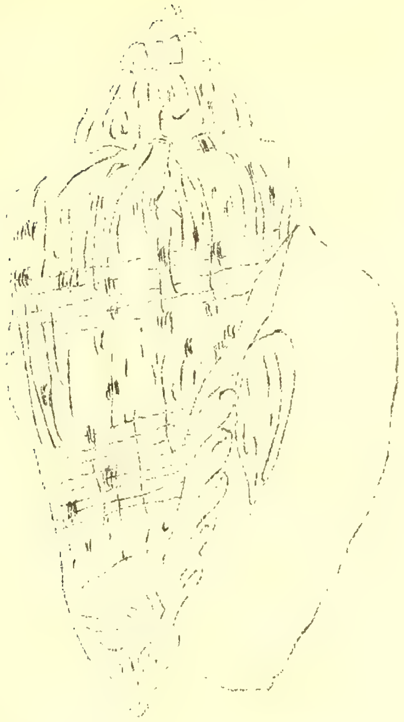
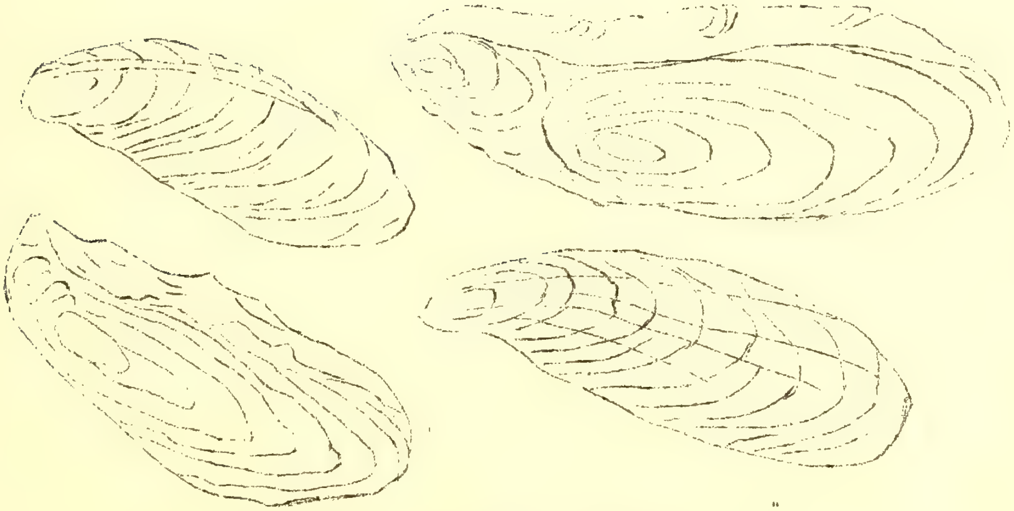
The Nautilus, Vol. 64, No. 1, July 1950 is at hand. Among the many fine papers in this issue is one of special interest to this coast. Dr. Joshua L. Baily Jr. describes a new genus of Muricidae for the group including the species, gemma, sant arosana etc. I am sure that this will meet with the hearty approval of all workers on this coast. Both Dall and later Grant and Gale grouped the species gemma and festivus under one subgenus although the two are obviously very different. Dr. Baily states that a study of the type of Jaton Pusch shows that it is almost an exact image of festivus. In our work Minutes 51 p 33 we placed them under the genus Pterynotus and followed Dall and others by placing both gemma and santarosana under the subgenus Jaton. While Dr. Baily does not mention this usage, it seems to be indicated that if we accept this generic classification we should at the same time elevate Jaton to generic standing to cover festivus, thus having Maxwellia gemma, etc. and Jaton festivus.

Dr. Alvin R. Cahn has a very interesting paper " Conchological Monuments in Japan". Dr. Fritz Haas " Some Land and Fresh-water Mollusks from Para State, Brazil "; Leslie Hubricht " The Polygyridae of Pittsylvania County, Virginia"; Dr. M.R. Carriker " Killing and Preservation of Bivalve Larvae in Fluids"; Dr. H. Burrington Baker " Chondropoma schalici"; Dr. Ralph W. Dexter " Distribution of the Mollusks in a Basic Bog Lake and Its Margins"; E. Sydney Marks " New Subgenera of Busycon Roeding".

Another paper which concerns us of the west coast as well as others is the conclusion of Henery Dodge's paper " Hiatella Daudin Versus Saxicava Bellevue". Mr. Dodge makes a very strong case for the use of Hiatella in place of the later Saxicava. No doubt California collections with few exceptions at this time have the species Saxicava arctica and S. pholadis in their cabinets. The labels on these should be changed to read Hiatella.



VOLUTA MUSICA CARNEOLATA
Showing relatively small size of the operculum X 1½



OPERCULUM OF VOLUTA MUSICA X 4
1. V. musica carneolata. 2. V. musica thiarella. 3. V. musica damula. 4. V. musica plicata. The variations are not constant in all cases.

THE SIXTEENTH ANNUAL MEETING OF THE AMERICAN MALACOLOGICAL UNION
June 14,15,16,1950 held at the
Chicago Natural History Museum, Chicago,Illinois

The annual meeting of the A.M.U. is past history, but as in the old song " The Memory Lingers On" and will for some time to come. The Museum provided excellent facilities and Dr. Fritz Haas was a genial host.

As is customary, the first morning, June 14th was devoted to registration, greeting old friends and meeting new ones which is very exhilarating and excites one's curiosity as to " who's who". By lunch time we had looked one another over quite thoroughly and with a feeling of good will toward all, we were directed to the cafeteria where a long table was reserved for the group.

While there were not as many papers presented as usual, they were all splendid.

Dr. Joseph P.E. Morrison's paper titled " American Ellobiidae" was of great interest. During a discussion period Dr. Morrison described one of his methods of radulae mounting.

A few slides of ancient vintage were shown by Gordon MacMillan while describing a field trip dated " way back when" the Derby hat was in full bloom. The very esteemed gentlemen who participated appeared to be attired more suitably for a day at the races than for a field trip. Collectors were Doctors Pilsbry,Bartsch,Aldrich, Clapp,Walker,Dall and J.B. Henderson Jr.

The paper given by Dr. Ralph Dexter " The Mollusks Inhabiting Temporary Pools in Ohio and Illinois" should encourage collectors to observe such pools when they re-appear in the springtime.

Dr. Bartsch gave a short history of the life work of his friend and colleague the late Dr. Carlos de la Torre after which he asked for a moment of silence in homage to the passing of Dr. de la Torre, Mr. Daniel L. Emery and Dr. T.C. Stephens.

Dr. Henry van der Schalie gave a very constructive paper " Notes on Leucochloridium- A Parasite of Succinea Snails" and exhibited very fine colored moving pictures of the infested tentacles of the snails, showing the characteristic pumping and varied color bandings.

Charles Bruce Lee read a most interesting paper on " The Ecology of Stenotrema hirsutum (Say)" in the region of Ann Arbor,Mich. The importance of lime, moisture and lighting were proven through field observations and experiments. Slides were shown of the areas of observation.

The slides flashed on the screen to illustrate Dr. Bartsch's paper on"The Collumnellar Armature" of the Cuban Urocoptid Land & Snails were superb and the varying forms of construction of the different species were amazingly beautiful.

Dr. A. Byron Leonard's paper " Molluscan Faunas and Climatic Changes in the High Plains Province" and " The Pearly Mussels of the Marais des Cygnes River of Kansas" by Dr. Robert W. Reese were very enlightening.

Last were pictures shown by Dr. Elmer G. Berry of " The Method of Raising Snails" at the National Institute of Health at Bethesda Md. It is quite obvious that Dr. Berry has plenty of material with which to carry on his experiments and research.

After the completion of the reading of the papers June 15, Dr. Haas escorted a group through the Shedd Aquarium and the Academy of Arts and Sciences.

The annual dinner was excellent and the speeches were enthusiastically applauded.

Dr. Jeanne S. Schwengel was a delightful hostess at her well attended buffet supper party given at the Stevens Hotel.

The third day of the meeting was very hot which no doubt discouraged many members from joining the field trip to the Indiana Dunes.

All agreed it was a fine meeting and we are greatly indebted to the museum and to Dr. Haas.

The Seventeenth Annual Meeting of the A.M.U. will be held in the Buffalo Museum of Science, Buffalo, N.Y., August 22,23,24, 1951. The Conchological Section of the Buffalo Society of Natural Sciences will co-host with the Museum and it is hoped that this meeting will be well attended.

The following officers were elected: President, Dr. Joseph P.E. Morrison, Smithsonian Institution, Washington, D.C.; Vice-president, Dr. Jeanne S. Schwengel, Greenwich, Conn.; 2nd Vice-president, Dr. Leo G. Hertlein, California Academy of Sciences, San Francisco, Calif.; Treasurer, Harold R. Robertson, Buffalo, N.Y.; Secretary, Mrs. Harold R. Robertson, Buffalo Museum of Science, Buffalo, N.Y.. Councillors-at-large: Dr. Carlos G. Aguayo, University of Havana, Cuba; Dr. Joseph C. Bequaert, Museum of Comparative Zoology, Cambridge, Mass.; Dr. G. Dallas Hanna, California Academy of Sciences, San Francisco, Calif.; Dr. A. Byron Leonard, University of Kansas, Lawrence, Kan.

Past presidents remain on the council without reelection.

Officers of the Pacific Division of the American Malacological Union, elected at the annual meeting in Santa Barbara, April 7 to 9 are: Dr. Leo G. Hertlein, Chairman; Dr. Wendell O. Gregg, Vice-chairman; Allyn G. Smith, Secretary-Treasurer.

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Occasional Papers on Mollusks Vol. 1 no. 15, June 26,1950.

This issue is a genuine contribution, a book in itself. " The Western Atlantic Marine Mollusks Described by C.B. Adams" By William J. Clench and Ruth D. Turner. It is in 172 pages with 21 excellent plates.

Basteria- Vol.14, No. 1 and 2, May,1950. This is the malacological periodical of the Netherlands. There are several papers in this issue of general interest. " Abnormalities in the Radula of Drymaeus virgulatus (Fer.) by Dr. L.A.W.C. Venmans and Bernard Verdcourt. This paper is in English and of interest to all who are concerned with the radulae.

" Precis des especes fossiles du genre Cryptomya Conrad" by C. Beets. The puzzle of Cryptomya truncata is discussed if not settled.

Bulletin, So. Calif. Acad. of Sciences Vol. 49, Part 1,1950

This issue contains one paper on mollusks " Natural History Observations of Prophysaon andersoni (J.G. Cooper), with Special Reference to Amputation."

MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA July 5,1950

The minutes were approved as printed for the June meeting.

Mr. Kanakoff had a large poster on the blackboard reading " Dear John Q. We are proud of you. Minutes 101 is a record etc."

One of the southern California shell enthusiasts sent a package of Olivella to Dr. Hertlein and neglected to have his name on the package. None of the members present sent it.

Mr. Grau read a letter from Canton Island telling of the great difficulties encountered in attempting to collect due to the number and viciousness of the sharks etc. It seems that visitors from other places such as the Hawaiian Islands are at first incredulous when told that they dare not enter the water but they soon find out that it is true. Mr. Turver suggested that many are having marvelous luck with traps, the West Indies, Gulf of Calif.,Jamaica etc. so why not try trapping a few over there.

Dr. W.O. Gregg was the speaker of the evening and he started out by saying that the subject of his talk would be well entitled What a Young Shell Collector Should Know. Many collectors start out and build up a rather large collection with little scientific data on them making a fine collection virtually valueless for any other purpose than that of curios. A uniform arrangement of boxes or trays is suggested 2 x 2, 2 x 4, 4 x 4, etc. so that they will fill a cabinet drawer fully. It is possible to purchase riker mounts in uniform sizes or plastic boxes. It is suggested that the name of the collector appear on the labels if known with the note collector or leg. Shells of any size may well be numbered with india ink and catalogued. The usual custom is to arrange the shells systematically, although in many cases such as land shells it is of interest to arrange them by localities. In cataloging, each set should have a separate number even though the same species and from the same locality. The date of collecting is also of value on many occasions. Spraying with DDT is advised to keep out silverfish and other pests. They may not eat shells but they do destroy labels.

Dr. Gregg after these few preliminary remarks read the rules of International Nomenclature and commented on them as he came to them. His talk was very interesting and enjoyed by all.

We are having a Pot Luck dinner before the meeting of Aug.1st at 6 P.M. but if you have to come late do not let that worry you. In other organizations this seems to promote a friendly atmosphere and we hope that our members will all attend.

Mrs. John Q. Burch- Secretary
4206 S. Halldale Ave., Los Angeles 62, Calif.
AXminister 27965 - Residence
Axminister 35710 - Business

The speaker of the evening at the August 1 meeting will be Mr. George Kanakoff who will speak on " The Land Shells of San Clemente Island".

MINUTES 103
AUGUST 1950
CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA

Subscription $2.50 per year

We are now meeting the first Tuesday of every month at 7:30 P.M. at the Los Angeles Museum, Exposition Park, Los Angeles, Calif. All interested persons are cordially invited.

Please mail all news to your editor,

John Q. Burch,
1584 W. Vernon Ave.,
Los Angeles 62, Calif.
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Home phone Ax 2-7965

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SOME NOTES ON PLACOSTYLUS

By Walter J. Eyerdam March 12,1950

The Melanesian Province includes those islands on which the remarkable group Placostylus occurs. The metropolis or center of greatest development is New Caledonia. The islands upon which this genus of large terrestrial snails occurs, form the periphery of what is supposed to have been a subcontinent in geological ages past. It is the site of the fabled " Los Continent of Moo".

Placostylus occurs in New Caledonia, Loyalty Is.,New Hebrides, Solomon islands, Santa Cruz Is., and the northern end of North Island, New Zealand in the south. It's farthest outpost in the east is Tonga and Cook or Hervey islands and Lord Howe in the southwest. It is found on all of the larger and some of the smaller islands of the Solomons, but is found no farther north than the south end of Bougainville island, and does not extend northwestward to the Bismark and Admiralty islands nor the islands west of the Solomons. It is unknown in New Guinea.

Dall described Placostylus dorseyi from Anair Island in the Solomons. This species is however a Partula and Anair Island is in the Bismark islands near New Ireland, formerly called New Mecklenburg.

A very small species like a Partula is Placostylus layardi Hartmann from Vate Island in the New Hebrides which is about 20mm in length.

The heaviest shelled Placostylus live on New Caledonia, but the largest that I know is the one I collected around Kira Kira, San Cristoval island. It is Placostylus cleryi Petit which is 122 mm in length. It lives on the conforvae in the high tree tops about 150 feet from the ground, and apparently comes to c earth only when natives cut down trees or when occasional branches are broken by heavy weather. No other Placostylus in the Solomons approaches this species in size.

About 45 species and subspecies of this genus are known to date from the Solomon islands. Of these I have collected 22 species while engaged as ornithologist on the Whitney South Sea Expeditionn for the American Museum of Natural History in 1929-30.

On the small island of Santa Anna and nearby shore of San Cristoval island Placostylus miltocheilus and its subspecies stramineus and albolabris are rather common in certain parts of the seacoast jungle where they live mostly on bushes and small trees. On Ulava island I found a new subspecies mayri Clench.

Malaita island was assigned to us for exploration, it being practically unknown ornithologically. Until but a few years before we came to the Solomons, Malaita was known throughout the South Pacific for its fierce headhunting cannibals. Only two years before we landed on Malaita there had occured the Sinerrango Massacre and the resultant British punitive reprisal which was even more vindictive in civilized savagery than the Nazi destruction of Lidice. Even today no white man is safe on Malaita except the missionary, the reverend Fox, who has spent the greater part of his life amongst the natives of the Solomons.

The Whitney expedition spend over three months on Malaita including one month in the interior among the mountain bushmen. No new forms of birds were found along the coast although large collections were made, but in the interior we collected 16 new species and subspecies of birds including a new genus. Four new species of Placostylus were found in the interior of Malaita. These were described by Dr. Clench in American Museum Novitates " Land Mollusca of the Solomon Islands". They are the following:

1. Placostylus (Acrostylus) ophir Clench
2. " " acutus Clench
3. " " malaitensis Clench
4. " (Proaspatus) almiranta Clench

Another new species, Placostylus (Proaspatus) gallegoi Clench I found in the mountains of San Cristoval I. Several other species were known only from the type specimens.

Dr. Eugen Paravicini, director of the Museum of Ethnography in Basel, Switzerland had spent two years in the Solomons collecting ethnographic and biological material. He had just left for Europe shortly before we came to the islands. He also was an ardent conchologist who collected shells in most of the territory where Dr. Wm. Mann had collected extensively in 1916. He found four new species of Placostylus in the Solomons. These are:

Placostylus (Placocharis) paravicinianus B. Rensch
Placostylus (Acrostylus) unicur B. Rensch
Placostylus (Proaspatus) vicinus B. Rensch
Placostylus (Proaspatus) kirakiraensis B. Rensch

In 1931, I visited Dr. Paravicini at the Museum of Voelkerkunde in Basel, Switzerland for three days and saw his fine collection of Solomon Island shells and ethnographic material.

Although the mountains of the larger islands of the Solomons are not as rich in molluscan species as the coastal regions and Papuina does not live in the mountains, still there is much exploring and collecting to be done before the snail fauna is well known.

Hostility of the fierce natives of Malaita has been accentuated more recently, by indoctrination of communism by American troops during W. War II, some of which established cells for organizing and maintaining a powerful and efficient group of able and ruthless gang of ruffians who succeeded in overthrowing British rule in 1947 and beheading all natives who resisted Marxian or Marching Rule as they call it. A determined British reprisal was finally carried out against the Malaitans with the use of two gunboats, an airplane and hundreds of well trained fighting jungle police boys. About 200 of the ringleaders of the Marxian rule were captured and many executed.

It is still unsage for white explorers to visit Malaita as the natives are very vengeful and have a fearless contempt for death. They are a proud and arrogant people, but nevertheless are noted for their honesty, virtue, hard work, and Spartan courage.

Malaita if thoroughly explored should still yield many new species of *Placostulus*.

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Mr. Eyerdam is spending this summer at Washington Bay, Kuiu Is., Alaska. Excerpts from his recent personal letter follow: " So far I have collected 102 species of mollusks in Washington Bay and will send you the list some day when I have a few more shells. The first prize so far goes to *Placiphorella rufa* Berry of which I found one specimen clinging to a piling under our dock. I believe it is known only from the original ones collected by George Willett on Forester Island. I really never expected to find a *Placiphorella* in Alaska, so it was quite a surprise. I looked the piling all over a couple of times at low tide but no more *Placiphorella*.

I set a shell trap baited with dead Salmon in deep water in the middle of the bay and got a fine large *Fusotriton oregonense* .

Our maintenance man is quite a sportsman and is always fishing in spare time. Recently he caught ten king salmon with rod and reel in a few hours after supper- including a 50 pounder. Two Sundays ago he caught 36 fine halibut in two hours. So we did a lot of hand canning. I got 40 No.2 cans out of it and he got about 100 and there were many fish for others to can.

One of our men thoughtlessly shot a bear from the dock without any reason whatsoever except the lust for killing. Most of our crew were quite indignant about it."

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The many conchological friends of Miss Miriam Shepard of Portland Oregon will find the following of interest. It is the announcement of her wedding. So she will from now on be Mrs. Teddy R. Roberts, 8920 S.W. 26th Ave., Portland, Oregon.

A NEW MUREX FROM THE WEST INDIES

By A. Hyatt Verrill

AARONIA STRAUSI: New subgenus. New species.

This shell differs so greatly from all other known species of Murex that I feel it should be the type of a new subgenus, as well as a new species. Its outstanding characteristics are the absence of all spines on the first three whorls, the very conspicuous ribs; the numerous thickly-spined varices extending diagonally or at an angle to the axis of the shell; the short stubby or " chunky" form with the last whorl almost globular; the distinct notch or channel at the upper angle of the aperture; the short upturned canal and the coloration.

First three whorls with no spines but with strong varices and conspicuous concentric ribs. Fourth whorl with low spines on the last four or five varices, these increasing in size and number on the fifth whorl. Last whorl with ten low varices extending from the shoulder to the extremity of the canal and placed at an angle to the axis of the shell, the upper extremity of each varice being in line with the posterior end of the varice preceeding it. Each varice with eight almost straight spines 4 to 6mm in length, broadened or fan-shaped at the tips and with their bases forming strong elevated concentric ribs. Each spine and the spaces between them with numerous raised ridges extending from one varice to another between the larger ribs. Canal short, broad, inclined to the left and with the extremity sharply upturned and bearing four blunt spines. A conspicuous groove or channel at the upper angle of aperture. Young specimens have no spines but the varices bear prominent nodules with interconnecting ribs and small ridges as in the adults. In these young shells the notch in the aperture is more

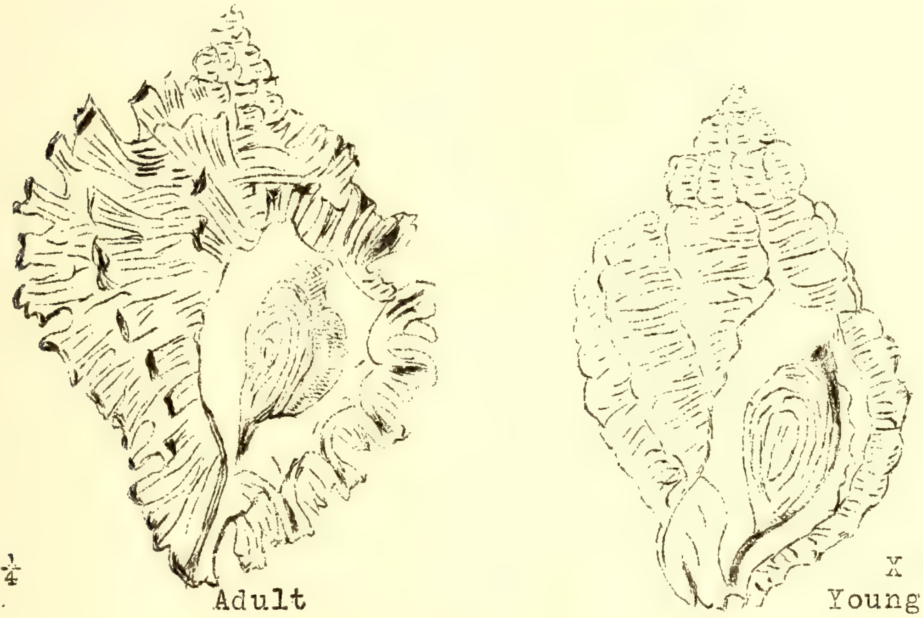
pronounced than in the adults.

Color, both adults and young, rich cinnamon-brown with spines and ribs seal-brown, the tips of spines almost black. Canal ochraceous .Interior of aperture and lip white. Operculum horny, thickened at center and with a thin membraneous edge. Surface with numerous concentric lines.

Length, adults: 50-59mm. Greatest breadth 36-40mm.
Length of young: 12-16mm

Three adult and two young shells taken in trap in 75 to 100 fathoms Soufriere Bay, Dominica, B.W.I.

Named in honor of Mr. Aaron Straus of Baltimore whose generosity and interest in conchology made possible my collecting expedition to the West Indies.



Aaronia strausi Verrill
Dominica, B.W.I.

Miss Ruth E. Coats, Tillamook, Oregon. Tillamook seems to be one of the conchological cross roads now. An example is from one of the recent personal letters " ... Hall and Evelyn Meier, Helen Long and Herbert Levis stopped in to see me the first of June. I particularly enjoyed talking to Hall about the models of the living molluscs. In the middle of July Mr. and Mrs. M.L. Walton and the Robert Alexanders were here. The Alexanders were headed for Puget Sound to collect on Orcas Island. I hope they ran into good weather. I enjoy visitors etc."
* Note* Might mention thos models of the living mollusc made by Hall Meier. They are really works of art reproducing every minute detail of the expanded animal. Of course, a true shell is used but the animal is made from plastic. They attract a grest deal of interest in our shop here.
Mr. and Mrs. Ralph Fox and their two daughters paid us a visit last week. They are on the way to Yosemite for a vacation.
Mr. and Mrs. C.D. McArthur of the McArthur Shop in Brentanos in New York were with us last week. We enjoyed visiting with them and shelling. They had just returned from a trip to Mexico and are on the return trip to New York.
Mr. and Mrs. A. Bronson, Guam. Their letters are always of real interest conchologically. A few excerpts from their last letter. " About the Murex ramosus I found on Karas (Palau Is.) they were very clean when found and out of twenty specimens collected all were snow white with a faintly pink aperture except two which had a slight grey over the body. They varied from 9 3/4" to 4¼" in the largest measurement.

Awhile back I mentioned Conus vicarius described in Webb's Handbook p 28 fig 8 as a rare shell. I had the shell identified in Honolulu as C. timarensis Lamarck. It looks however like the above figure in Webb. * Note* Mr. Bronson seemed to be a bit dissapointed in his skill at classification etc. but in my experience the Conus timorensis is a good shell. By the way I note the authority given as Lamarck. I have always used Hwass. I wonder which is correct ? Recall trying to work it out once from the Encyc. Meth. where the original Hwass Conus are figured and discovered that it takes a scholar to figure out just who wrote what in that work, a combination of Bruguiere, Hwass, Lamarck, Deshayes et al.***

" I probably sound like a poor promotor but I like these serene people. They seem to be about the last outpost of sanity in a world gone hay wire. Their economy has been pretty badly upset by the introduction of guests such as the coconut beetle etc.

Mrs. Margaret Teskey, 144 Harlem Ave., Buffalo 10, N.Y.
We owe Mrs. Teskey an apology for having overlooked to mention the fact that it was her hard work that prepared the reports on the meeting of the A.M.U. which we ran in the last issue. Mrs. Teskey is very active in A.M.U. and her efforts should be appreciated.
Mrs. Katherine Van Winkle Palmer We look forward with interest to the publication of her work on the Carpenter types. " I have 37 octavo plates of types so you can see there are a few to illustrate."
Frank A. Waidelich, Welfare and Recreation, U.S. Naval Station, Tongue Point, Oregon. They hhve returned from the South Pacific and are not stationed as above. " ... I wonder if you could tell me what is the largest Murex ramosus Lam. you have record of. While on Koror in the Palau Is. I stumbled on one 9¼" in length. For its sizze it was light, spines quite nice."

MINUTES OF THE CONCHOLOGICAL SOCIETY OF SOUTHERN CALIFORNIA
August 1950 meeting

The meeting was called to order by the president Mr. George Kanakoff at 7:30 P.M. The door prizes were awarded. Mr. Kanakoff greeted the members and guests and called attention to the presence of Mr. and Mrs. Jim Marsh for many years among our most active members but who have recently been unable to attend for reasons of health. We were all glad to see them back and looking well. Mr. Marsh addressed the club calling attention to the work done by the late Miss Edna Cook on the southern California fossil mollusks. She was responsible for finding several new species some of which were named in her honor. Mr. Marsh then presented the club with 10 copies of a paper " The Geological Strata" with notes and time tables and also 8 geologic time tables to be given to members at the discretion of the president.

The minutes of the previous meeting were approved as published in the Minutes of the S.C.C.C.

Dr. A. Howard told of a new shell, a species of Julia , a very interesting talk and well illustrated on our blackboard, but we had perhaps better not discuss this at any length until after Dr. Howard publishes on it. It will be both a new genus and a new species to be added to the fauna of this coast.

Mr. Arden Edwards spoke on data blanks for specimens. This brought up a general discussion of the information that should accompany every specimen. Mr. Edwards had some excellent ideas and has been requested to submit a sample lable which will be mentioned and described in the minutes when approved.

The door prizes, presented by the Burches were awarded at the beginning of the meeting 7:30 P.M. It was suggested that any one wishing to furnish door prizes will be properly thanked. We feel that these door prizes stimulate interest and attendance. It is not difficult for many of us to present one good shell whereas it is a different matter to present enough of any species to go around the membership. It might be well to advise the secretary in advance but not necessary of course.

The speaker of the evening was Mr. George Kanakoff who spoke on the molluscan fauna of the Channel Islands. A resume of his interesting talk will be given in the Minutes at a later date.

It was generally agreed that the Pot Luck Dinner was a success and it was voted to continue them until further notice.

Mrs. John Q. Burch- Secretary

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NEXT MEETING - TUESDAY, Sept. 5,1950 7:30 P.M.

Pot Luck Dinner at 6:30 P.M. All attending are requested to bring their own service and a pot luck dish. Those, batchelors especially, who find this inconvenient may phone the secretary and arrangements can be made through her, Mrs. John Q. Burch, 4206 Halldale Ave., Los Angeles 62 Phone Ax 2-7965 or Ax 3.5710.

Door prizes and an interesting program has been arranged. Mr. A. Arden Edwards will talk on the proper labelling of specimens.

Mr. Besson will talk on his recent trip to Punto Penasco.

PUBLICATIONS RECEIVED

Guia de Naturalistas Sudamericanos- 1949 Buenos Aires. This is a very interesting directory. 138 pages listing both persons and institutions of all of the South American countries. It is of course, in Spanish but gives their interests, the correct present addresses etc. Of course, all naturalists are listed including malacologists. If interested this book may be had from John Q. Burch- price $2.50.

Journal of Conchology, Vol. 23,No.4,19 July,1950. There are as usual many fine papers in this issue but none of them pertain directly to the fauna of this coast. Hygromia cinctella in England by A. Comfort; Habitat of Clausilia rolphii Turton by L.W. Stratton;Planorbis corneus (L) var rubta by L.W. Stratton; The Alleged Occurance of Helix aspersa Muller in Kitchen Middens in Cheshire by N.F. McMillan;Resistance of Littorina saxatilis to Lowered Salinity by N.F. McMillan; Growth Stages of Cyclope Neritea by B.S. Kisch- also Odostomia eulimoides Han. on Chlamys caria; A New Species of Pomacea from Venezuela by T. Pain; The Spermatophore of Milax sowerbyii by H.E. Quick; Mollusca of a Sewage Works by W.D. Fisher; Laciniaria biplicata in Somerset by A.H. Turner.

Revista De La Sociedad Malacologica " Carlos De La Torre" Vol. 7 No.2 July 15,1950. The reproduction of the photography and the plates in this periodical are always remarkably good. This issue contains Reproduction De Caracolus Sagemon by L.H. Rivero; A New Genus and Species of Endodontidae from the Solomon Islands by Wm. J. Clench (species collected by the Rev. Fox); Nuevos Helicinidos de la Provincia De Oriente,Cuba by Clench and Aguayo Two New Species of Cephalopods from the Florida Keys by Gilbert L. Voss.

* Boletin de Historia Natural De La Sociedad " Felipe Poey". This is an interesting and well prepared periodical and a new one. This is issue Vol. I, No. I. In this issue to my mind the outstanding contribution is " Bosquejo Historico De La Zoologia Cubana (i) by Carlos Guillermo Aguayo. In this paper the work of the many writers on Cuban zoology of the past is being reviewed.

Those interested in this publication should write to Dr. C.G. Aguayo,Museo Poey, Universidad de la Habana. The price of this issue is listed at .50. There is no question but that all who are interested in the fauna of the West Indies will wish it.

* Catalogo Moluscos De Cuba - by C.G. Aguayo and M.L. Jaume Nos. 651 to 670 Inc. have been mailed continuing this splendid work which will soon be completed and definitely indispensible to all concerned with West Indian mollusks.

The Molluscan Fauna of the Cocoe-Keeling Islands, Indian Ocean by R. Tucker Abbott. Reprint from the Bulletin of the Raffles Museum, Singapore. No. 22, April 1950.

A full review of the interesting points brought up in this 30 page paper would require considerable space. I do not know how available this reprint may be but it is a paper that will be frequently referred to by all who are working with shells of this fauna as well as no doubt others all over the south Pacific.

A few interesting changes in nomenclature are involved. For example most of us have the very large Lambis labelled now Lambis bryonia (Gmelin), as I have had mine named. The name should be Lambis truncata Humphrey 1786. Gmelin's name is of 1791. Several new species are described. (over)

Succinea koolingensis n. sp. is thoroughly described and figured.

Review of the Rissoidae of New South Wales from the Records of the Australian Museum, by Charles F. Laseron. Jan. 1950 This is a very well prepared paper in 31 pages with 94 figures.

Shell Notes by Frank Lyman Vol.2,1950 Nos. 10,11,12 combined. Frank's Shell Notes are always beautifully prepared and of real interest. This is a well printed booklet of 36 pages with numerous plates. Frank writes " Dear John Q.: Some of the fellows in California and elsewhere seem to fear asking for Shell Notes. For your information and all others, there is no charge for my shell papers. All one had to do to get a copy of Vol.2 , Nos. 10,11,12 combined is to write and ask for it. No charge ! Just like that. It is my desire to serve my fellow collectors well and while it is true that I do not know much about conchology, I do learn. I am sharing my poor knowledge with all who care to cooperate." If you are not getting Frank Lyman's offers you are missing a fine thing. Write Frank Lyman, Lantana, Florida.

Pacific Grove Museum of Natural History, Pacific Grove, Calif. Mr. Morton E. Hinshaw, Curator is to be complimented for the attractive illustrated bulletin just printed. The Pacific Grove Museum is taking its place among our worth while West Coast institutions.

State of California- Fortieth Biennial Report of the Dept. of Fish and Game for the years 1946-1948. This is a large report of 148 pages . They always intrigue my interest. Simply by opening at random I find figures on shells that amaze me. For example Pismo Clams shipped into California from Mexico. In 1945 53,000,000 pounds, a slump in 1946 to 11,408,000 . More of the same but that sounds like a lot of clam chowder to me.

And can you imagine 38,000,000 pounds of squid. I have to look twice to be sure they didnt add some extra zeros.

And the seizures, fines etc. are of some interest. For illegal taking of abalones in 1947 there were 576 arrests, $18,495 fines and 40½ days served in the clink. Seems to be about the same for several years. And many arrests etc. for taking clams, with seeminglat larger fines and more jail 79½ days served last year in jail for illegal clamming.

Circulares Del Museo y Bibliotheca De Malacologia De La Habana Editor M.L. Jaume, 13 No. 351, Vedado, Habana. $1.50 for 100 pp. Pages 325 to 350 are at hand and contain a vast amount of interesting news. These papers should be in all libraries devoted to the interests of malacology.

Puget Sound Oyster Bulletins No. 7 -11 Inc. have been received. These bulletins are devoted to the interests of the commercial oyster growers and contain many interesting notes on oysters.

The Academy of Natural Sciences of Philadelphia- We wish to announce the recent publication of an article on conchology- N 224 Wurtz, Charles B. Quadrula(Quincuncina) guadalupensis sp. nov. (Unionidae: Pelecypoda). 3 pp 5 figs. (Published 3/22/50) 25¢

MINUTES 104
SEPTEMBER 1950
CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA

Subscription $2.50 per year

We are now meeting the first Tuesday of every month at 7:30 P.M. at the Los Angeles Museum, Exposition Park, Los Angeles, Calif. All interested persons are cordially invited.

Please mail all news to your editor,

John Q. Burch,
1584 W. Vernon Ave.,
Los Angeles 62, Calif.
Telephone Ax 3-5710
Home phone Ax 2-7965

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Fusitriton oregonense Redfield as carrier host of marine animals

By Walter J. Eyerdam

Washington Bay, Kuiu Island, S.E. Alaska   Sept. 10,1950

Today, being Sunday with a minus tide at 6:35 A.M., I decided to make one more foray along the rocky shores of Washington Bay after starfishes and shells, before leaving for home in a few days from the herring plant of Storfold and Grondahl Packing Co.

Fusitriton oregonense Redfield reaches perfection in the deeper waters of the bay where it lives in the mud and scavenges dead fish. During the summer I often caught up to a dozen on gunny sacks with salmon heads lowered into about 150 foot depth. At extreme low tide they are more or less common in spots where they are often subject to acting as carrier host of various marine organisms. As a rule the shells are not badly eroded. On Afognak Island and in the Aleutians I have seen them exceedingly common at low tide while laying their eggs. Every one of them were so badly coroded by calcareous algae, mostly Chilosporum sp. and Amphiroa sp. and other nullipores that often the shell was almost unrecognizable.

In Washington Bay the shells are not much infested by nullipores and usually with animal growths, a shell is otherwise not much damaged except perhaps a worm spire.

While collecting starfishes this morning I took about twenty Fusitriton from the walls of sea cliffs at extreme low tide mark. They were selected mostly for the purpose of examining the infestations of various animal growths and such animals animals acting more or less as parasites. The following is a partial list of those organisms, most of which I was able to recognize quite correctly off hand.

Sponges

1. Grantia sp. (urn sponge)
2. Suberites latus (Lambe) (hermit sponge) several shells inf.
3. Esperella ? - small fragments
4. Cliona sp. (bread sponge)

Coelenterates

5. Obelia dichotoma Linne (Sea plume) A phase of the medusa
6. Hydrocoral sp.

Platyhelminthes (worms)

7. Serpula columbiana (Johnson) Calcareous tube worm
8. Spirorbis occidentalis (Stimpson)

Bryozoa (moss animals)

9. Bugula murrayana (Johnstone) Stag horn bryozoan
10. Retipora pacifica (Robertson) Lace coral bryozoan
11. Flustra lichenoides (Robertson) Sea may bryozoan
12. (bryozoan) sp.
13. "

Terebratulidae (Brachiopoda)

14. Terebratalia transversa (Sowerby) 2 specimens
15. Terebratulina unguicula (Carpenter) 2 specimens

Mollusca

16 Mytilus edulis Linne- very small- a few
17. Volsella modiolus (Linne)
18. Littorina sitchana (Philippi)
19. Crepidula nivea (C.B. Adams) Always on the operculum. Note- In my opinion this is an unnamed variety which I believe lives only on the operculum of Fusitriton oregonense.
20. Cerithiopsis frazieri Bartsch - one specimen on bread sponge

Crustacea

21. Balanus cariosus Pallas- Rock barnacle. A few small ones.
22. Balanus crenatus (Bruguiere) Smooth acorn barnacle. Common

Chordata

23. Boltenia villosus (Stimpson) Hairy sea squirt. One large
24 Corella inflata (Huntsman) Inflated transparent sea squirt

There were also a number of other species of animals on these snails which I did not recognize, several of which I couldn't even guess which phylum they belong to. These are preserved in spirits for future diagnosis.

There are many other biotic forms to be found on the hairy triton and it would probably be of no little interest to compile a more comprehensive list of them. This could best be done by a student at a marine biological station such as Friday Harbor.

Of all the parasites clinging to Fusitriton there are few if any that are true parasites. They merely cling to the hairy snail for a place of attachment and are hardly even symbiotic in habit. The main purpose of attachment for most of these animals seems merely to gain a foothold from overcrowding of other organisms. Moving about perhaps also gives them access to more food.

TWO NEW WEST INDIAN SHELLS

By
A. Hyatt Verrill

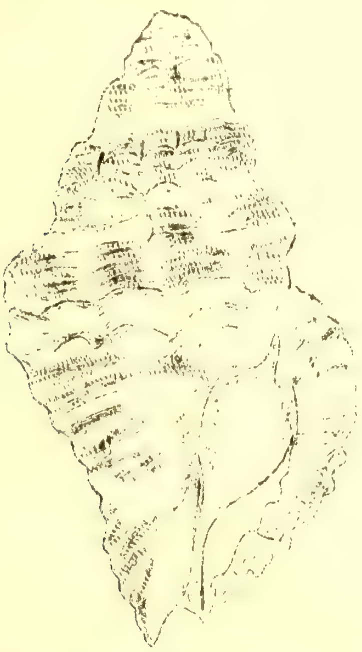
ENGINA LEUCOZONIA VERRILL - New Species

Whorls five. Each whorl with strong rounded longitudinal ribs and conspicuous concentric ridges. Ribs slightly nodulose at shoulders. Color rich mahogany brown with a broad white band encircling the last whorl just above aperture. Another interrupted white band near lower end of aperture and an interrupted white band at shoulder. Siphonic canal narrow, curved to the left. Edge of lip strongly toothed. Callus purplish brown. Edge of lip and columella white.

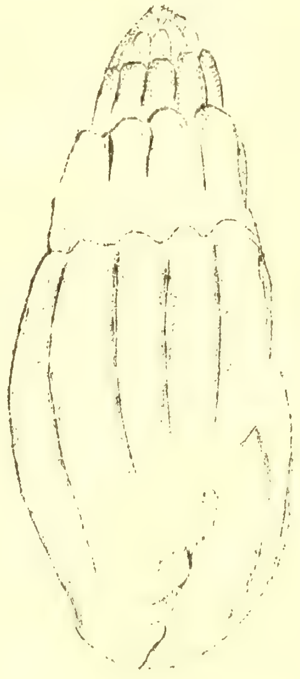
Length of type 25 mm. Breadth 17 mm. Three mature specimens from the Island of Nevis, British West Indies. Type in author's collection.

MITRA BRANDII VERRILL, New Species

Whorls five. Shell rather "chunky" eight to ten low rounded longitudinal ribs ending in low nodules at shoulders. Colum with four plaits the upper two much larger than the others and the uppermost very large and conspicuous. Apex low, rounded, rather obtuse. No visible sculpture. Color dull brownish or greenish orange. Columella pale yellow. Length 24 mm. Breadth at center of last whorl 12 mm. Two specimens from 75-100 fathoms off Dominica, B.W.I. Names in honor of Prof. Louis Brand. Type in author's collection.



Engina leucozonia x3



Mitra brandii x 4

MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA
September 5,1950

The president Mr. George Kanakoff welcomed the members present at 7:30 at which time there was a drawing for a door prize. Mrs. Han Hjorth was the recipient of two fine Fusinus dupetithouarsi collected and presented by Mr. and Mrs. H.A. Edwards. The label accompanying the shells gave a wealth of information. Also Mr. Jack Baker gave a fine specimen of Cypraea maculifera that he personally collected in Hawaii

The minutes of the August meeting were approved.

Mr. Kanakoff displayed a shell taken off Rocky Pt.,L.A. Co. 3 ft. below low water mark in July,1949 by Mr. Beck. The specimen was sent for examination to Dr. Hertlein of the California Academy of Sciences, San Francisco. Dr. Hertlein's letter, Aug.9,1950 " After comparison with specimens here and a review of the literature, we conclude that your shell is close to the one described by Reeve as Purpura affinis... The species is said to live on the outer side of reefs in Polynesian waters and it may have considerable variation. To date I have not discovered the name applied to the larger form similar to your shell." It isn't uncommon for shells from foreign countries to be carried over in water ballast and pumped out washing ashore. Such finds always interest collectors.

A card was read from the E.P. Chaces who are vacationing in northern California.

A picture of a " What's It" , strange creatures from off Dominica, B.W.I. was passed around. No one felt able to identify them from the picture. Some suggested Brachiopoda, others an Echinoderm while others would not hazard a guess but suggested having one of the animals in hand rather than working from the photo alone. Thanks to Mr. Verrill for sending us the photo.

In the absence of Mr. Grau, the program chairman, the secretary was asked to take charge of the program.

Mr. H.A. Edwards gave a well illustrated and instructive talk-first on the work desk, how he arranges his desk so that every-thing is easy to get at. His desk has a plate glass top with a shelf below where material you are working with can be placed and can easily be seen. On a rack above were bottles and jars for storing liquids and materials, those you constantly work with. The second part of Mr. Edwards talk was on the importance of labels and data that should be included. Mr. Edwards would like to educate the conchologist to give more and better information on their labels. Some of things he recommends are family, genus, species, authority,date, locality, habitat, collector or exchanger. What would you like on your label ? Let us know.

Mr. L. Bossom gave an account of his vacation at Punta Penasco and Cholla Bay,Mexico. One turns south at Gila Bend,Arizona to the border which is open 8 to 5 o'clock. Fee for 60 days is $3.00 It is necessary to carry in all water and vegetables. The roads are black top and not bad. Mr. Bossom showed on his map what and where he got the material he exhibited. All desired to go there to collect this winter. But if you don't like hot weather go only Oct. to April. Your secretary knows as she lived in Mexico years ago.

We were pleased to have Dwight Taylor with us again.

Mrs. John Q. Burch- Secretary
4206 Halldale Ave.,Los Angeles 62

J.D. Cleghorn, Curator of Zoology, McGill University, McGill University Museums, Redpath Museum, announces that through the generosity of Mr. Lovell G. Mickles of Montreal, the molluscan collections of the Redpath Museum, mainly the extensive Carpenter collection, is to be reorganized. An important feature of this work will be the cataloging of the collections (See description, Nautilus, vol. 58, No.3, 1945, pp 97-102). The project will be under the direction of Katherine V.W. Palmer, assisted by Vincent Condé , of the Cardenas Museum, Cuba. In addition to the older molluscan collections Mr. Mickles has built up a fine collection of Cuban shells which he has presented to the museum.

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Dr. Thomas A. Burch, Beatrice and the grandchildren John Q. III and Janthina are with us for a month after having been stationed in Guatemala for the past four years.

****

Mrs. George Bengston- Colleen Ave.,(Evansdale) Waterloo, Iowa
This is the address of the newly purchased home, shell room and all.

Dr. A. Myra Keen, Stanford University - " Your little paragraph on the pronunciation of " nomenclature" pleased and interested me. I, too, have long been puzzled about the esoteric accent on the second syllable. Somebody must have perpetrated it first by analogy with the manner of accenting classic words (but even this would be incorrect because of the long vowel in the penultimate syllable), and other people, being ignorant of classical rules and supposing the first somebody really knew what he was doing, meekly followed along. The same idea as the accenting of " pianist" on the first syllable, another matter that has always bothered me. Being a conservative, I shall go on saying pian'-ist and nom'-enclature! By the next generation, however, the other pronunciation may have gained the ascendency by repetition and may have attained the sanction of even Webster's dictionary. Who knows ?"

****

The Annual Report 1949 of the Chicago Natural History Museum is at hand. An interesting and illustrated report on the work of this great institution. 140 pages.

****

W.S. Adkins, Houston, Texas We enjoyed an afternoon with him recently, and hope to see him again soon.

****

A note about TELEVISION by the editor. We have not as yet indulged in a set probably because unfortunate programs whenever we have seen them. One of my recent visits to a friend who owns one had a solid hour of a rerun of a third class western movie including the lengthy chase after the villain. Same picture would no doubt cost a dime in one of the Main St. all nights at that. And it seems to me that everything I have ever seen on Television was a huge lot of nonsense, although must admit that I was entertained by seeing Gorgeous George wrestle one evening.

BUT they are getting some really worth while things. And those fortunate enough to get KGO-TV on Thursdays 7 to 7:30 P.M. will see the program of the California Academy of Sciences, " Science In Action" and these are really worth while. The program continues the rest of the year or at least on into December.

****

MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA

Oct.3,1950 meeting

The meeting was called together by the president Mr. George Kanakoff at 7:30 P.M. The meeting was held in the Hancock Foundation, The University of Southern California. Thirty persons were present.

There was a drawing for the door prize and Mr. Arthur Price was the lucky person, or unlucky as you wish since there was no door prize - so the Burches gave an I.O.U. door prize.

Since the Minutes had not been issued it was moved to dispense with the reading of the minutes of the previous meeting.

Visitors were introduced and welcomed. Mr. Warren Addicott of Pomona College was present. Mr. Addicott is working on the ecology of mollusks.

Dr. Thomas A. and Beatrice Burch were present with their children John Q. III and Janthina, who are visiting Tom's parents. Dr. Burch, M.D. holds a commission with the National Institute of Health, and has just returned from a project in Guatemala where he has been working for the past four years.

Communications were read from Mr. and Mrs. Gillis who were victims of an automobile accident but are now on the road to recovery/

Mr. and Mrs. Robert R. Alexander are home in San Diego after an extended trip.

It was moved that a vote of thanks be sent to the Hancock Foundation for the privilege of meeting in the building while the Los Angeles County Museum building is being repaired.

Mr. and Mrs. E.P. Chace told of their recent vacation. They collected land shells at an altitude of 5,000 ft. and many other interesting specimens.

Dr. Thomas A. Burch told of some of his work in Guatemala, and mentioned that at odd times he had collected many interesting marine and fresh water shells, as well as entomological ,botanical and other material which he sent to interested scientists.

Dr. Arthur D. Howard of the Hancock Foundation gave a brief report on Cyrilla subdolus on which he will no doubt publish.

Mr. Gilbert C. Grau was the speaker of the evening and gave a very excellent paper on his favorite specialty, the Pectinidae. His beautifully mounted specimens covered all tables and the platform and included a great many rarites to be found in few of the largest museums. A report on this paper will appear in these minutes at a later date.

Mrs. John Q. Burch- Secretary

The next meeting will be held Nov. 7 at the usual place in the Los Angeles County Museum at 7:30 P.M. However, we will have the pot luck dinner at 6:30. Bring your favorite dish or the batchellors may notify the secretary and arrangements will be made for them.

****

Mr. and Mrs. Hjorth and family recently returned from a collecting trip to northern California. They collected the following species while they were working at Crescent City, Calif.---

Olivella biplicata, O. baetica, Tegula funebralis, Thais lamellosa, Tegula brunnea, Searlesia dira, Crepidula adunca, C. nummarius, Acmaea scabra, A. mitra, A. limatula, A. asmi, Lottia gigantea, Protothaca staminea, Irus lamellifer, Littorina planaxis, L. scutulata, Homolapoma carpenteri, Pholadidea penita, Saxicava arctica, Epitonium belastriatum,

*** NOTE*** The next issue of the Minutes will be a copy of the Glossary on which Mrs. Beatrice Burch assisted by Dr. Thomas A. Burch have been working for several years. It will be an illustrated glossary of terms used in the study of gastropoda, scaphopoda, and amphineura. The paper will be of about 100 pages.

It is our intention to issue an occasional large paper to the subscribers to the Minutes when our funds permit.

****

Mr. Arthur Blok, ' Downs Cot', Falmer Road, Rottingdean, Sussex, England " In Mr. Don Wilson's interesting paper in Minutes 98, he mentions that the oldest historical record that he knows concerns money cowries, viz. Marco Polo's discovery of them as currency in Yunnan in the thirteenth centura. The following may be of interest to him or to your general readers - if so kindly make any use that you like of my note.

The Marco Polo record of the use of money cowries in Yunnan as currency in the thirteenth century was a relatively late one. The whole history of the use of cowries as currency is probably best treated in Dr. J. Wilfred Jackson's classical paper " The use of Cowry-shells for the Purposes of Currency, Amulets, and Charms" in the Memoirs of the Manchester Museum, Vol. LX (1916), No. 13, 72pp, with 2 maps and 4 text figs. This paper is full of references to a large number of original sources used by Dr. Jackson in its compilation and is a mine of information to students interested in this aspect of the subject.

I quote a few extracts: p 45 " In early times, it is thought, cowries were brought to India from the Philippines and Borneo, as well as from the island of Bima near Macassar (Celebes); in later times they were obtained from the Laccadive and Maldive Islands. Of the latter, the Arab Masudi, in the first half of the tenth century, remarked that the queen had no other kind of money than the cowries.---"; p. 46. " The Arab author Ebn Beithar, who died in 1248, also mentions the Maldives as a locality from which cowries were obtained; p. 55." In the Far East, cowries, both large and small, were used as a medium of currency long before the Christian era ---- It seems certain, however, that cowries were in circulation among the people of eastern China in the seventh century, B.C. and the southern country of Ts'u figures largely in connection with supplies of these shells for currency."

It may also be known to your fellow-students that two sizes of bean-shaped coins were issued by the king of Ts'u some time about 600 B.C., and that these are known in native numismatics as Hopei tsien because their shape resembled that of the cowries that they ultimately superceded. An order issued in B.C. 221 by the King of Ts'in prohibited thereafter the use of cowries, gems, pearls, tortoise shells and tin for currency purposes. (Jackson. loc. cit. p. 56).

****

Johnsonia Vol. 2, No. 29 " The Genera Sthenorytis, Cirsotrema, Acirsa, Opalia and Amaea in the Western Atlantic" by William J. Clench and Ruth D. Turner. A review of the important conclusions reached in this paper will appear in a later issue.

Catalogo Moluscos De Cuba- C.G. Aguayo and M.L. Jaume. Two more parts of this fine work have been completed pp 671 to 700 Inc.

Carded

File I

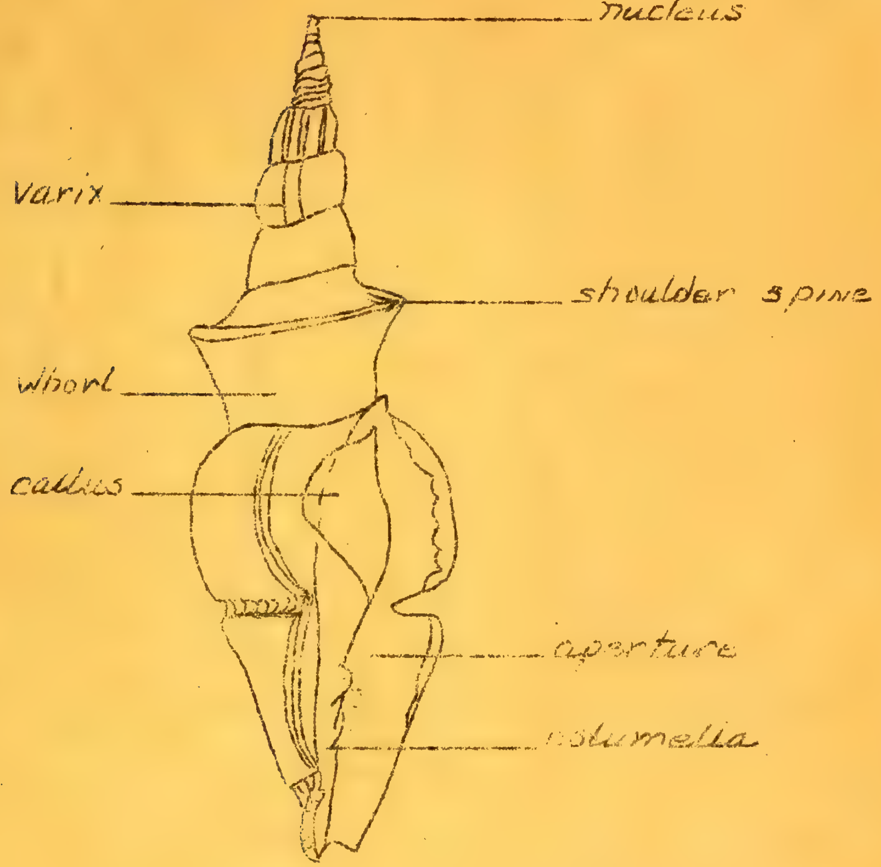
Illustrated Glossary of Gastropoda, Scaphopoda, Amphineura

by Beatrice LaRue Burch

Conchological Club of Southern California

Minutes 105 $1.50
November 1950

ILLUSTRATED GLOSSARY
of
GASTROPODA. SCAPHOPODA. AMPHINEURA


nucleus
varix
shoulder spine
whorl
callus
aperture
columella

by Beatrice LaRue Burch

The Conchological Club of So. California
John Q. Burch, editor

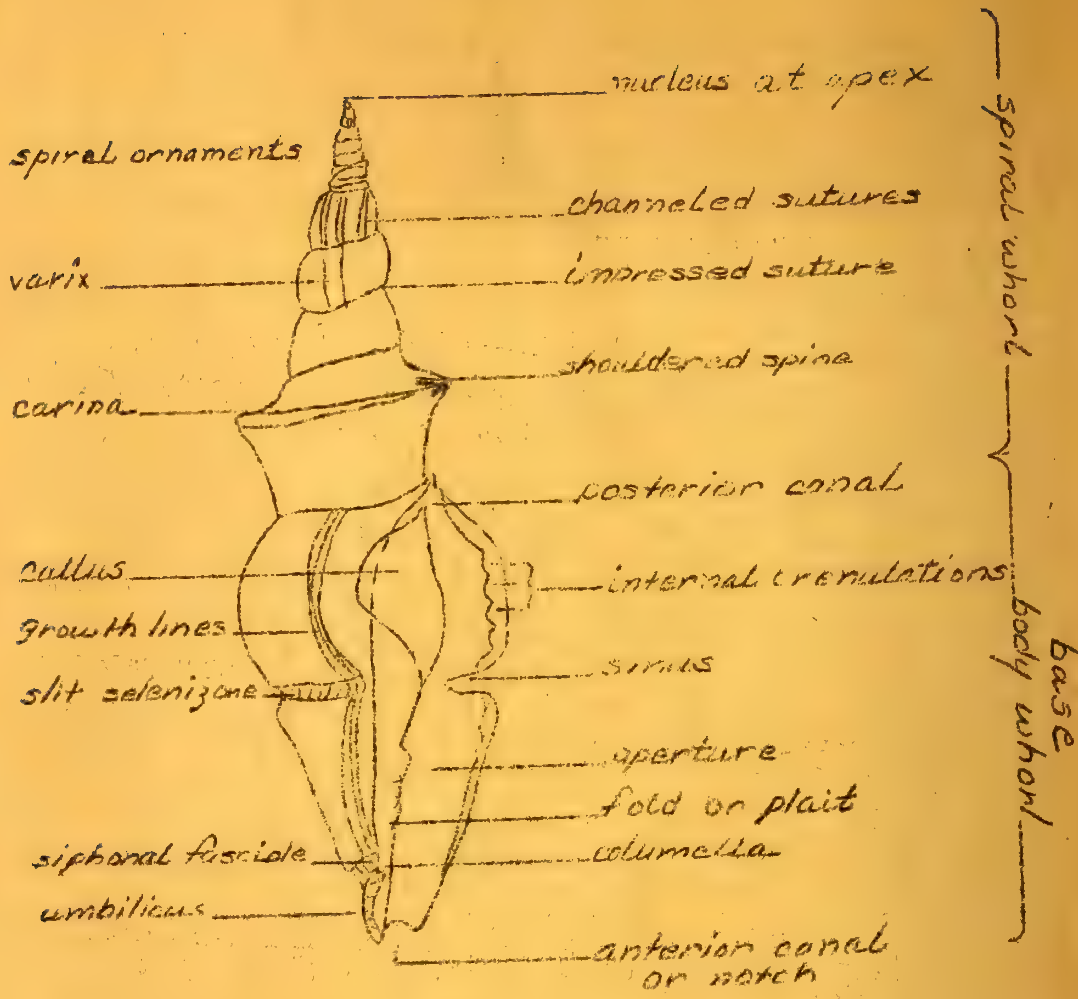

nucleus at apex
spiral ornaments
channeled sutures
varix
impressed suture
shouldered spine
carina
posterior canal
callus
internal crenulations
growth lines
sinus
slit selenizone
aperture
fold or plait
siphonal fasciole
columella
umbilicus
anterior canal or notch
spiral whorl
body whorl
base

fig. 1 stylized gastropod after Shrimer and Schrock

CHITON STRUCTURE

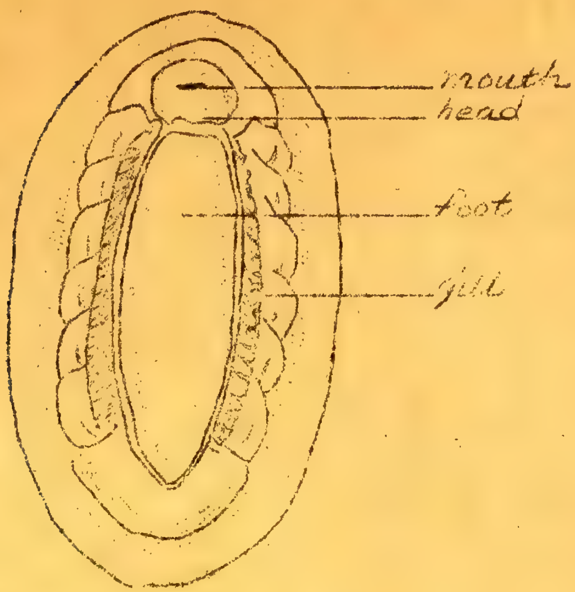

mouth
head
foot
gill

fig. 2 chiton - ventral view
after Iredale

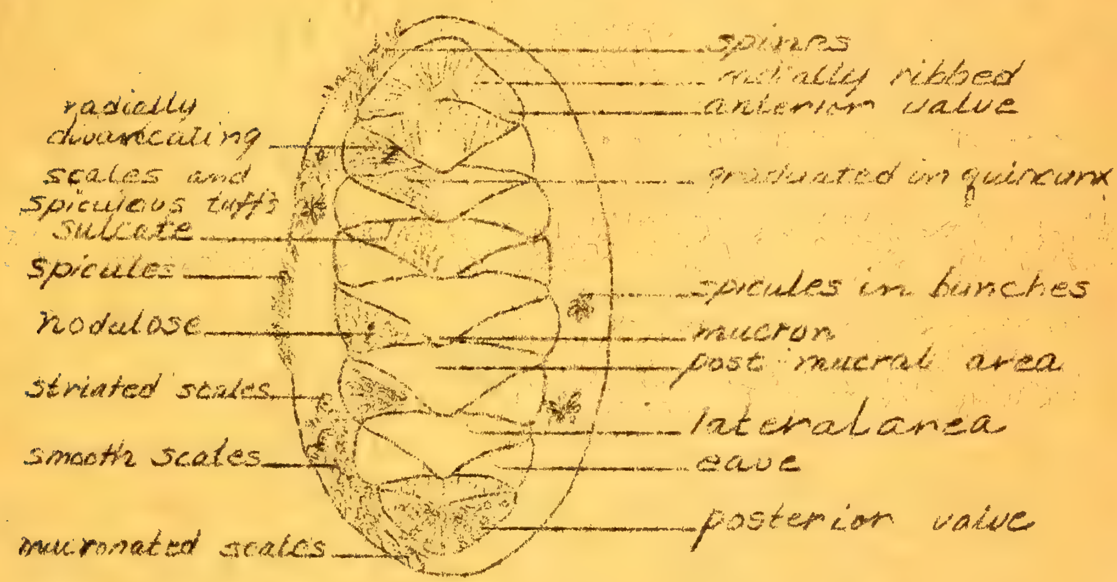

spines
radially ribbed
anterior valve
radially divaricating scales and spiculous tufts
graduated in quincunx
sulcate
spicules
spicules in bunches
nodulose
mucron
post mucral area
striated scales
lateral area
smooth scales
eave
posterior valve
mucronated scales

fig. 3 chiton sculpture - dorsal view
after Iredale - diagram -

CHITON ANATOMY

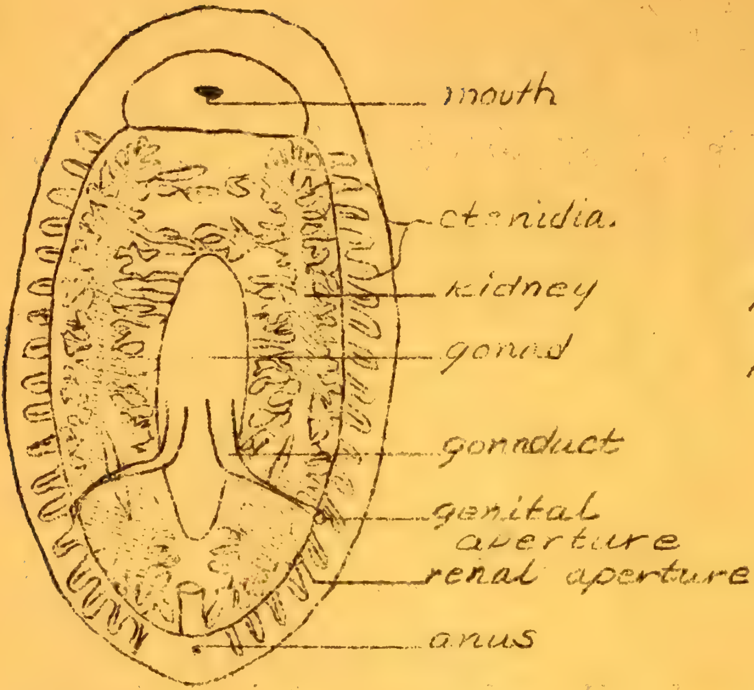

mouth
ctenidia.
kidney
gonad
gonoduct
genital aperture
renal aperture
anus

fig. 4 chiton
after Parker & Haswell
excretory & genital systems

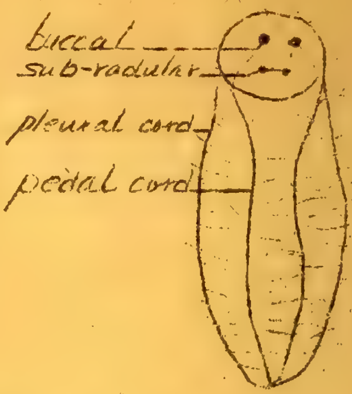

buccal
sub-radular
pleural cord
pedal cord

fig. 5 chiton
after P & H
nervous systems

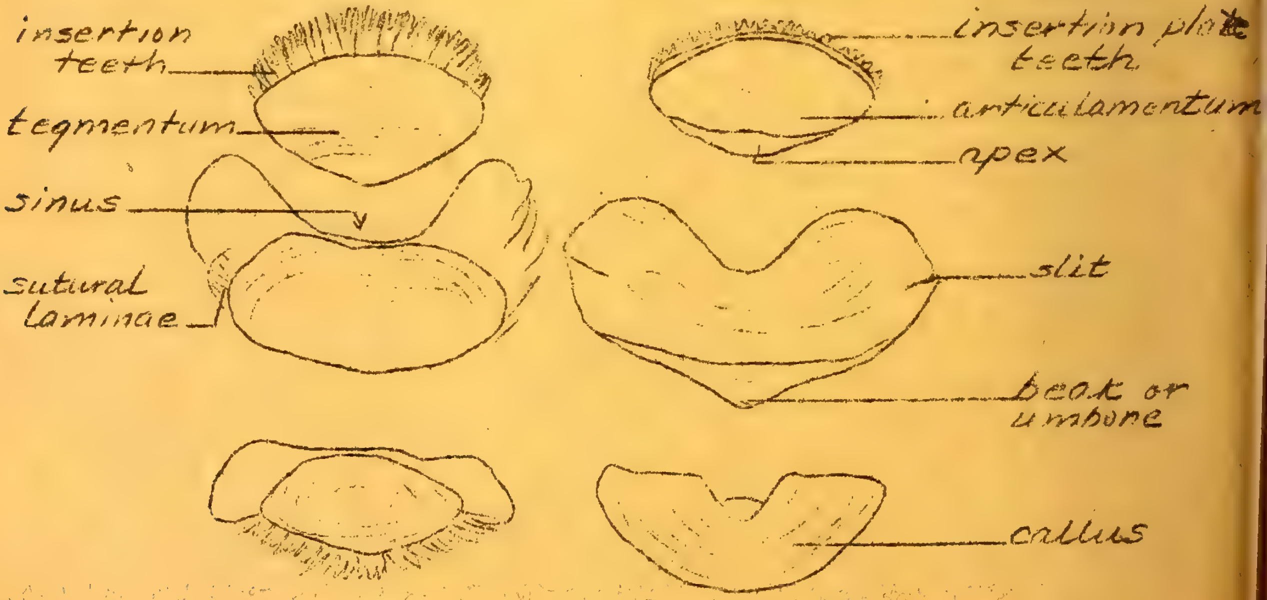

insertion teeth
tegmentum
sinus
sutural laminae
insertion plate teeth
articulamentum
apex
slit
beak or umbone
callus

fig. 6 dorsal view

ventral view of the first, middle, last value

after Iredale

DIGESTIVE SYSTEM

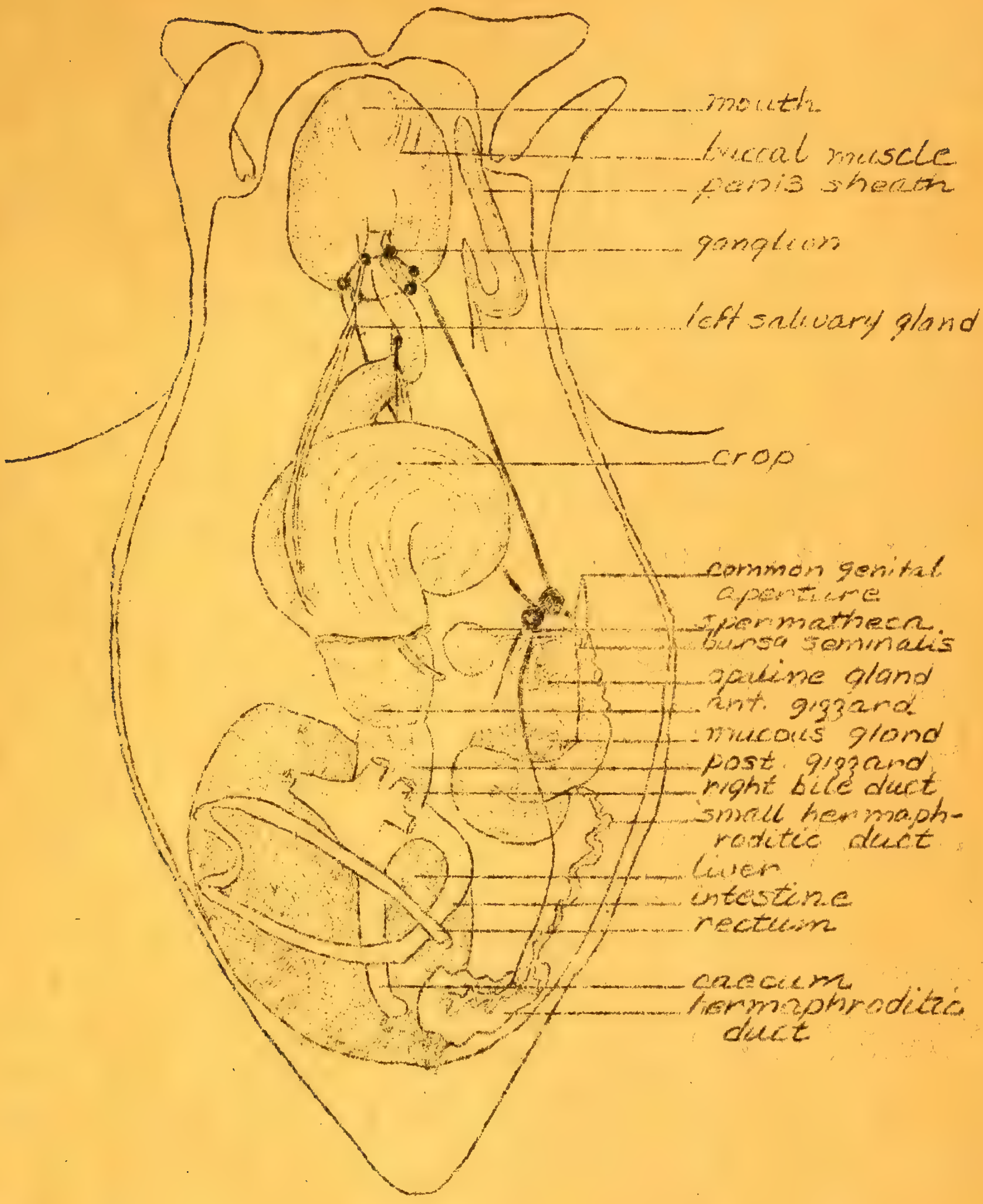

mouth
buccal muscle
penis sheath
ganglion
left salivary gland
crop
common genital aperture
spermatheca
bursa seminalis
opaline gland
ant. gizzard
mucous gland
post. gizzard
right bile duct
small hermaphroditic duct
liver
intestine
rectum
caecum
hermaphroditic duct

fig. 7 - Dorsal view - Aplysia after Eales

INTERIOR of PULMONATES

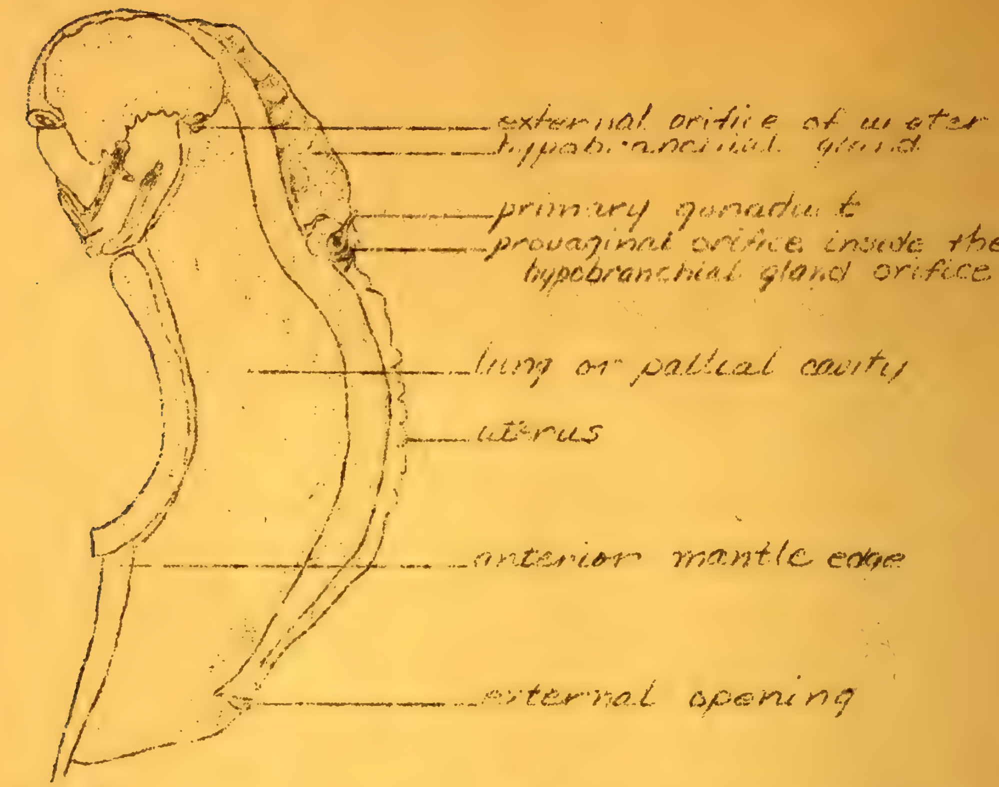

external orifice of water
hypobranchial gland
primary gonaduct
provaginal orifice inside the hypobranchial gland orifice
lung or pallial cavity
uterus
anterior mantle edge
external opening

fig. 8 ventral view of pallial complex of female Hendersonia — after Baker

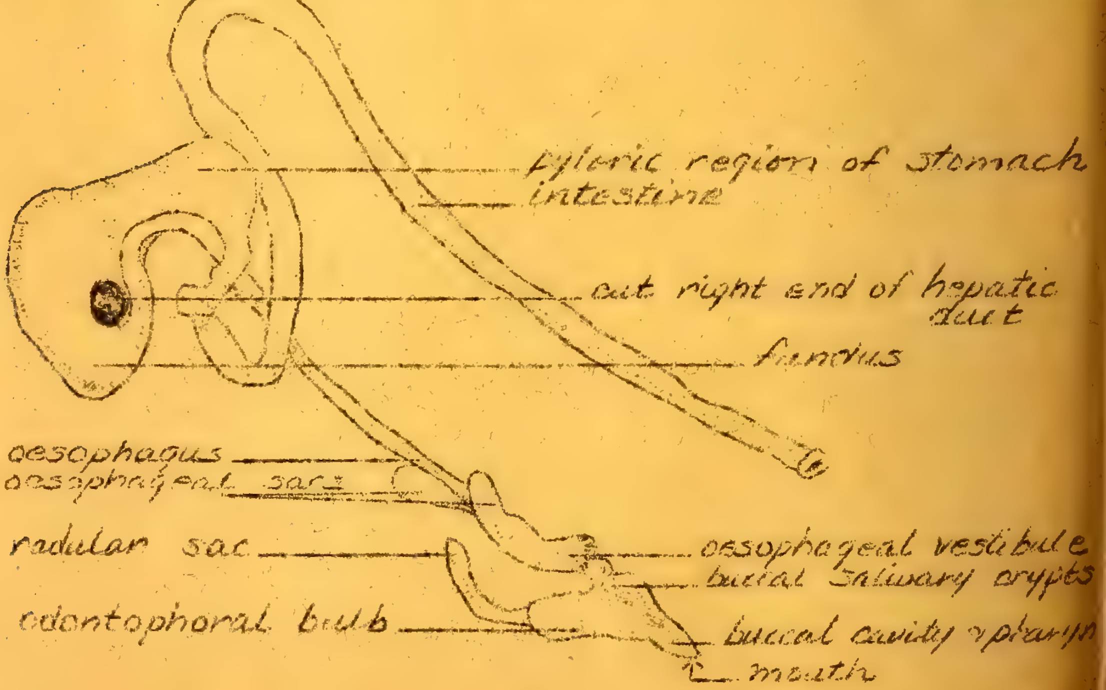

pyloric region of stomach
intestine
cut right end of hepatic duct
fundus
oesophagus
oesophageal sac
radular sac
odontophoral bulb
oesophageal vestibule
buccal salivary crypts
buccal cavity & pharyn
mouth

fig 9 Alimentary tract, liver and odontophoral muscles absent — after Baker
Hendersonia

INTERIOR of GASTROPODS

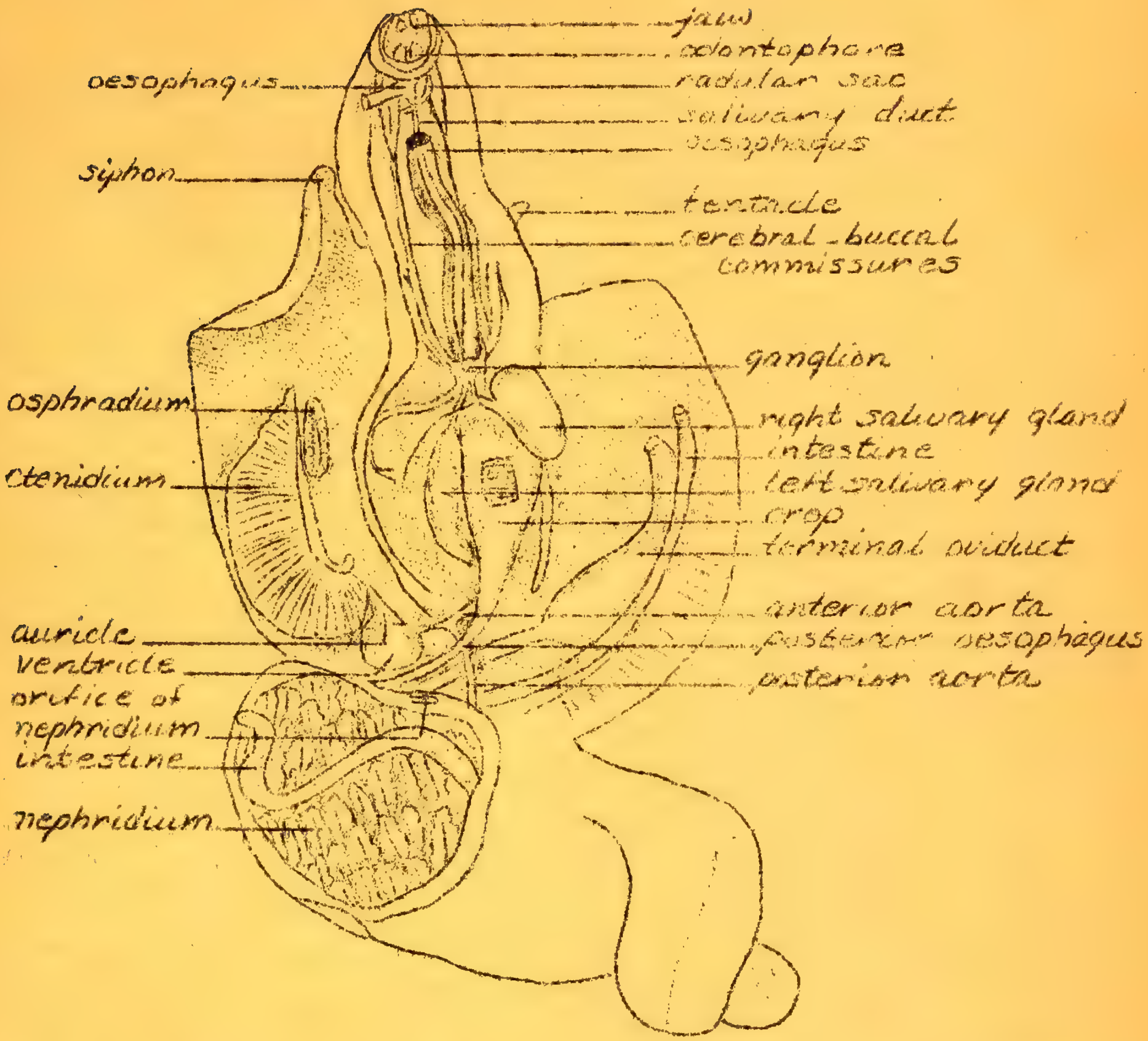

jaw
odontophore
oesophagus
radular sac
salivary duct
oesophagus
siphon
tentacle
cerebral-buccal commissures
ganglion
osphradium
right salivary gland
intestine
ctenidium
left salivary gland
crop
terminal oviduct
anterior aorta
auricle
posterior oesophagus
ventricle
posterior aorta
orifice of nephridium
intestine
nephridium

fig 10 Triton rubicundus — female dorsal view
after Parker and Haswell

INTERIOR of PATELLA

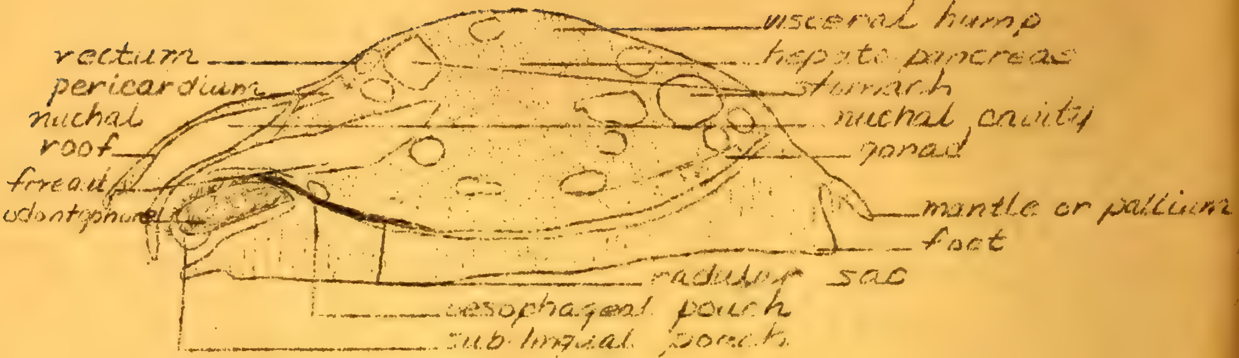

rectum
pericardium
nuchal
roof
foregut
odontophore
visceral hump
hepato pancreas
stomach
nuchal cavity
gonad
mantle or pallium
foot
radula sac
oesophageal pouch
sub lingual pouch

fig. 11 Sagittal section Patella
after Davis and Fleure

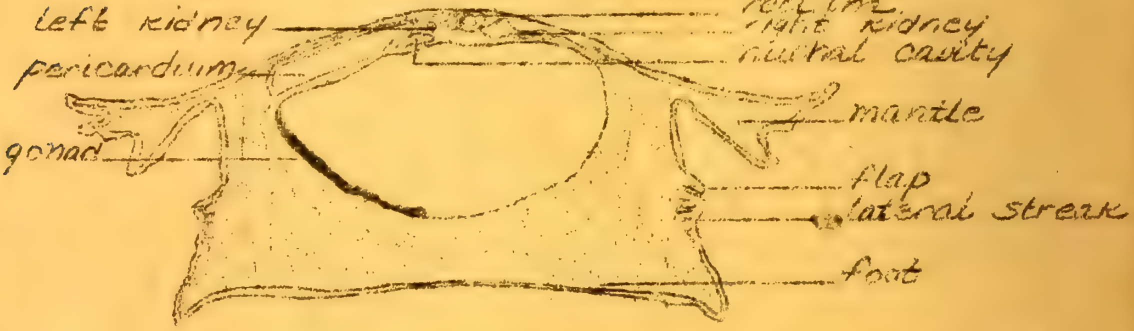

left kidney
pericardium
gonad
rectum
right kidney
nuchal cavity
mantle
flap
lateral streak
foot

fig 12 Diagram of cross section of
young Patella — after Davis and Fleure

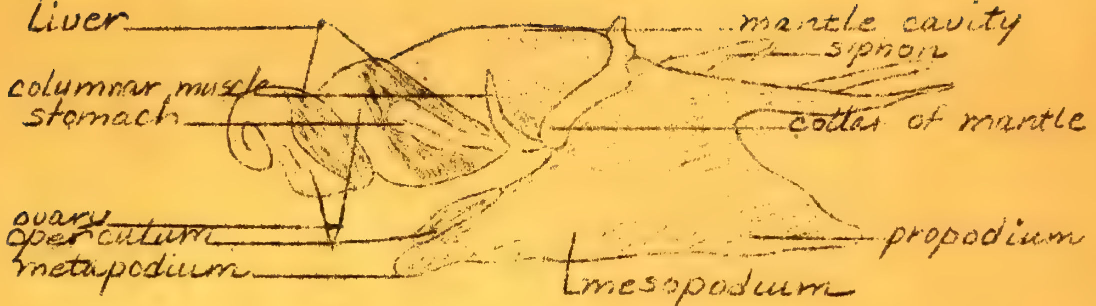

Liver
columnar muscle
stomach
ovary
operculum
metapodium
mantle cavity
siphon
collar of mantle
propodium
mesopodium

fig. 13 Lateral view of female Triton rubicundus omitting shell — after Parker & Haswell

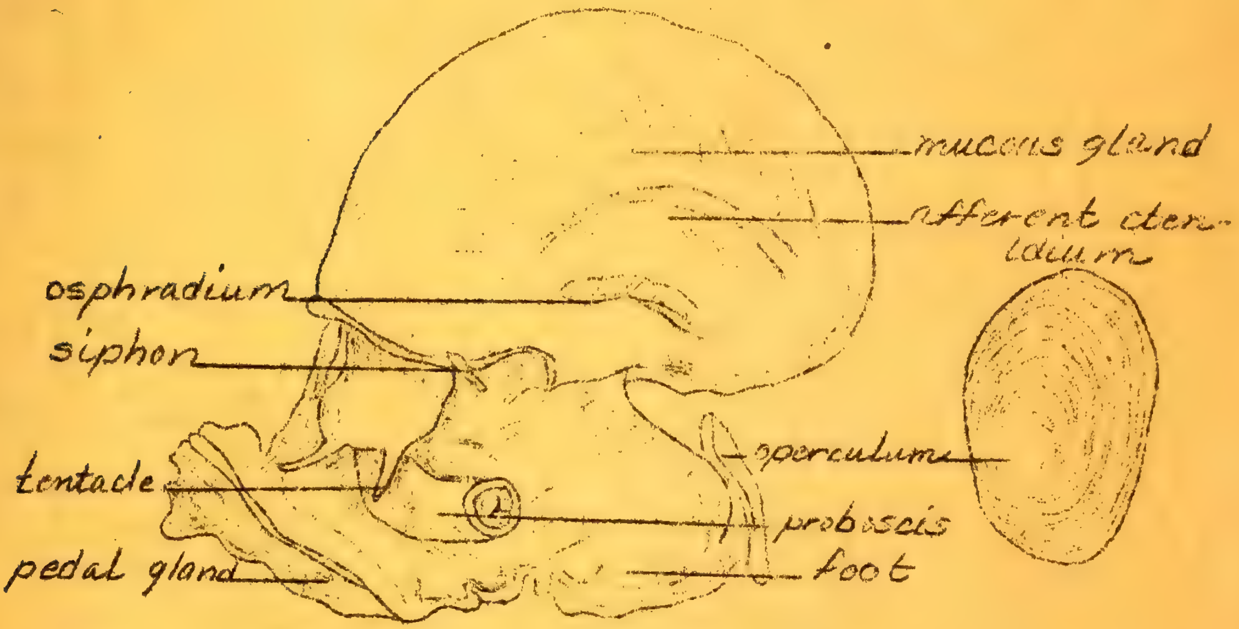

osphradium
siphon
tentacle
pedal gland
mucous gland
afferent ctenidium
operculum
proboscis
foot

fig. 14 Buccinum without shell — after Dakin

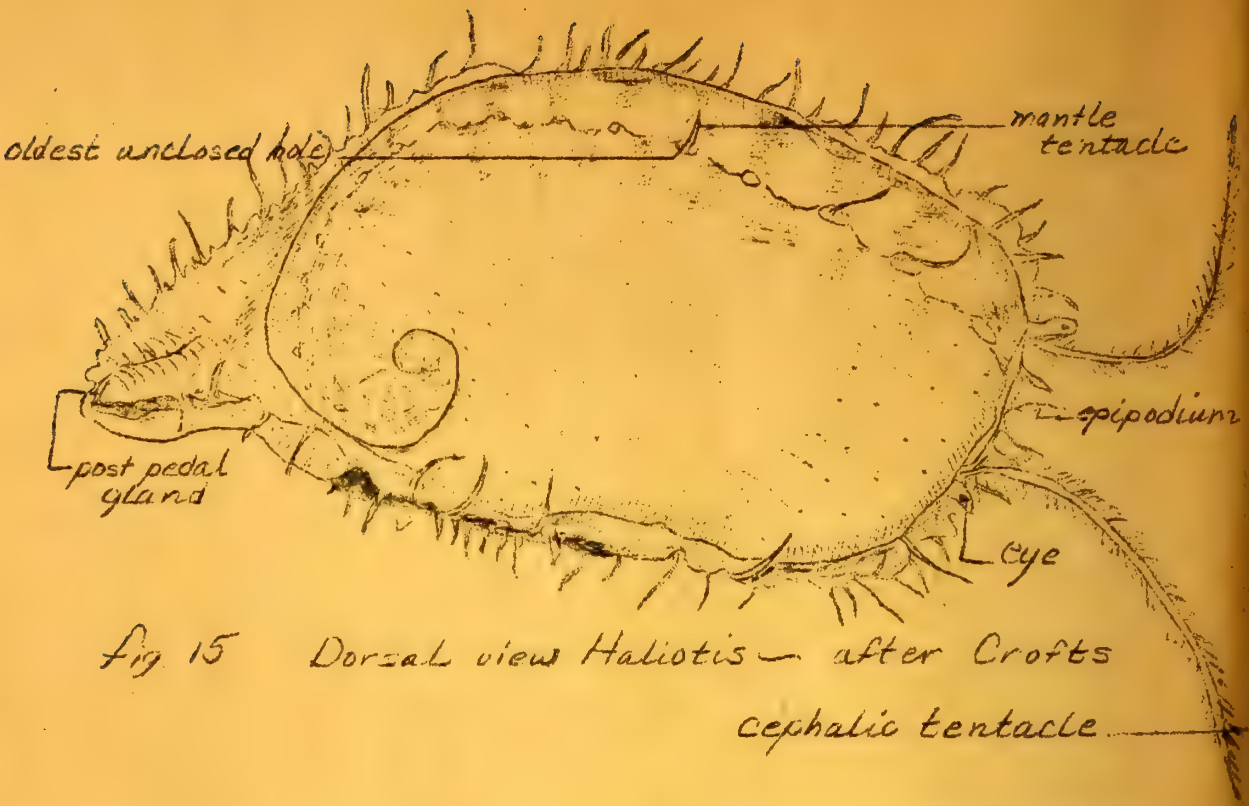

oldest unclosed hole
mantle tentacle
epipodium
post pedal gland
eye
cephalic tentacle

fig. 15 Dorsal view Haliotis — after Crofts

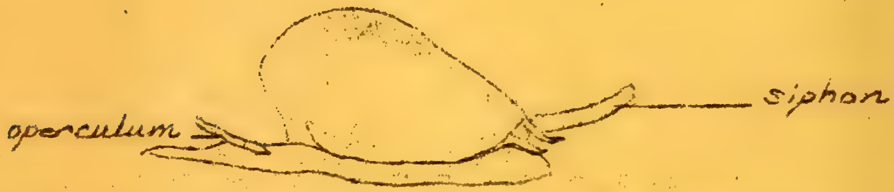

siphon
operculum

fig. 16 Lateral view Conus californicus
after Johnson and Snook

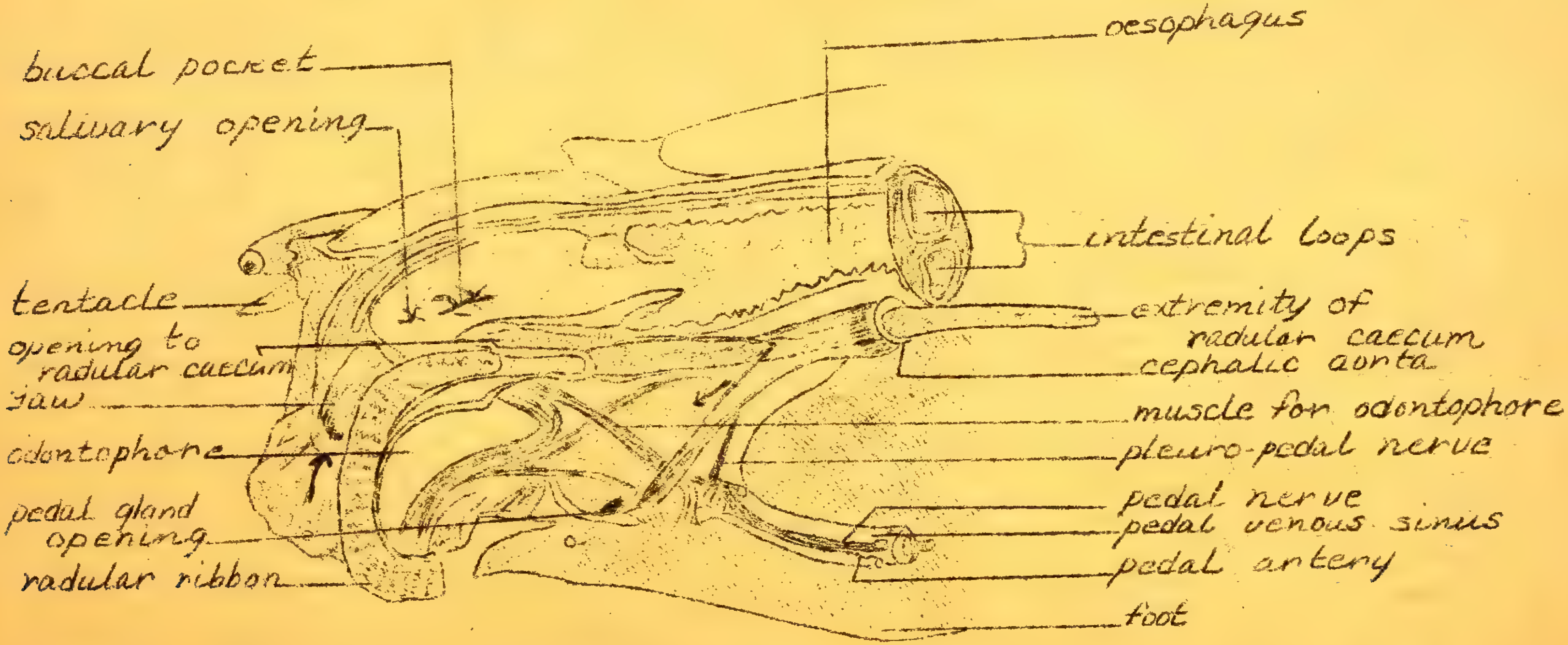

buccal pocket
salivary opening
tentacle
opening to radular caecum
jaw
odontophore
pedal gland opening
radular ribbon
oesophagus
intestinal loops
extremity of radular caecum
cephalic aorta
muscle for odontophore
pleuro-pedal nerve
pedal nerve
pedal venous sinus
pedal artery
foot

fig.17 Diagram of sagittal section of Haliotis
thru the buccal area — after Crofts

CIRCULATORY SYSTEM

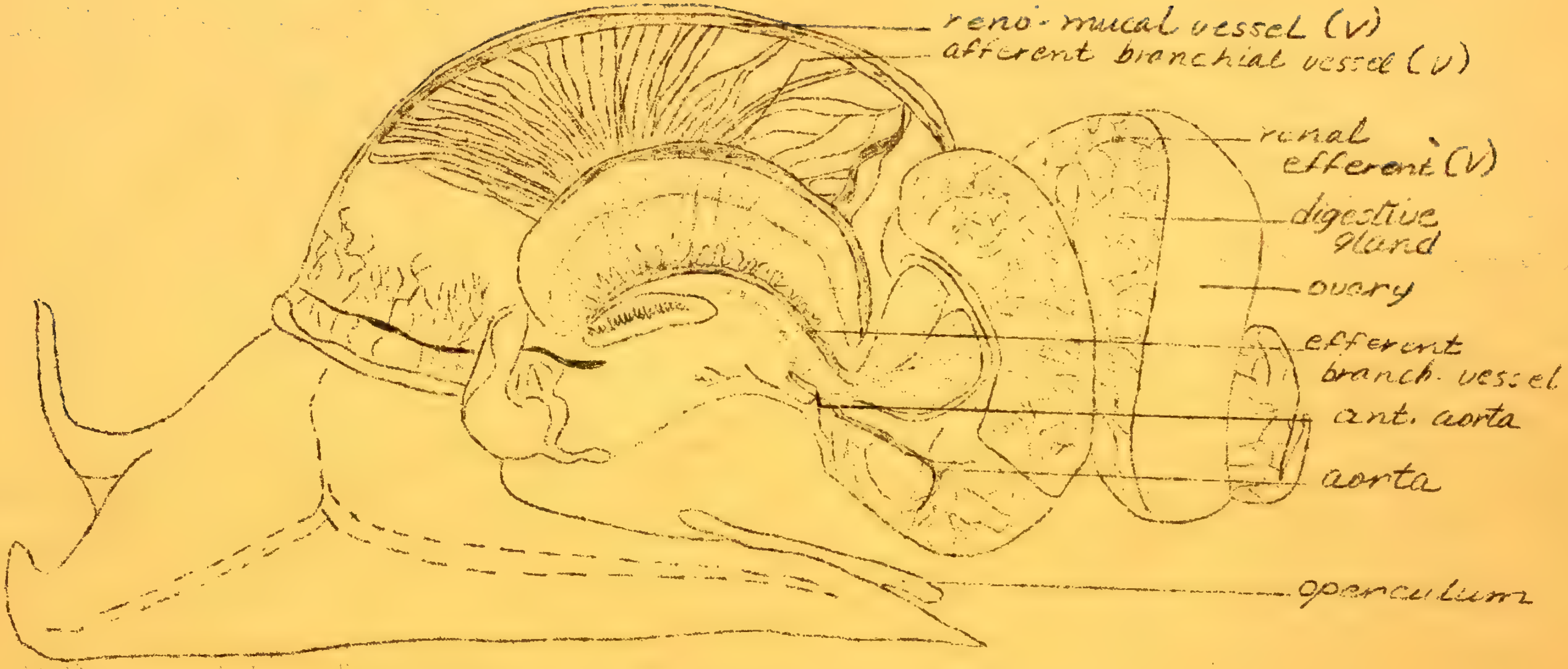

reno-mucal vessel (v)
afferent branchial vessel (v)
renal efferent (V)
digestive gland
ovary
efferent branch. vessel
ant. aorta
aorta
operculum

Fig. 18 Tethys — after Johnson & Snook

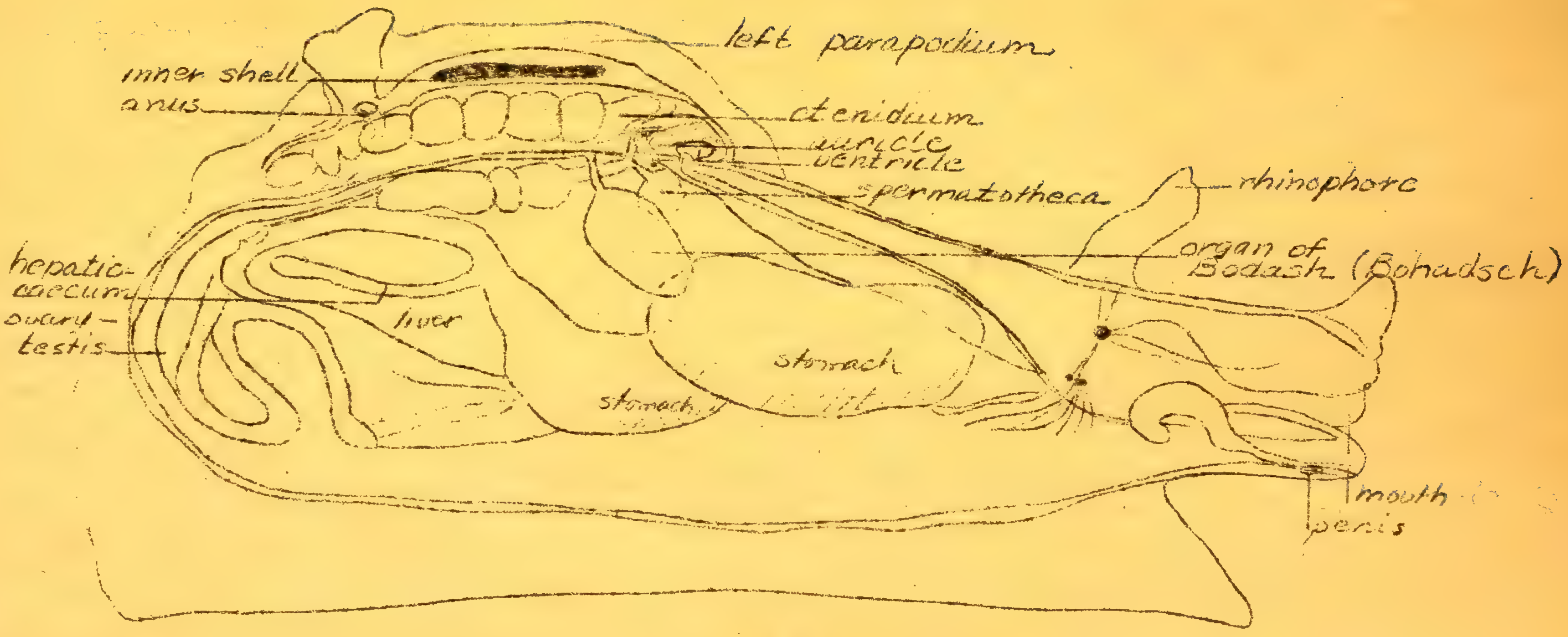

left parapodium
inner shell
anus
ctenidium
auricle
ventricle
spermatotheca
rhinophore
organ of Bodash (Bohadsch)
hepatic-caecum
ovary-
testis
liver
stomach
stomach
mouth
penis

fig. 19 Tethys — after Johnson and Snook

EMBRYOLOGY

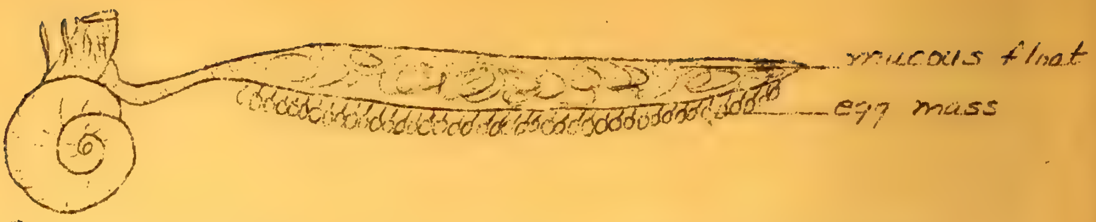

mucous float
egg mass

fig. 20 Ianthina communis – after Sowerby

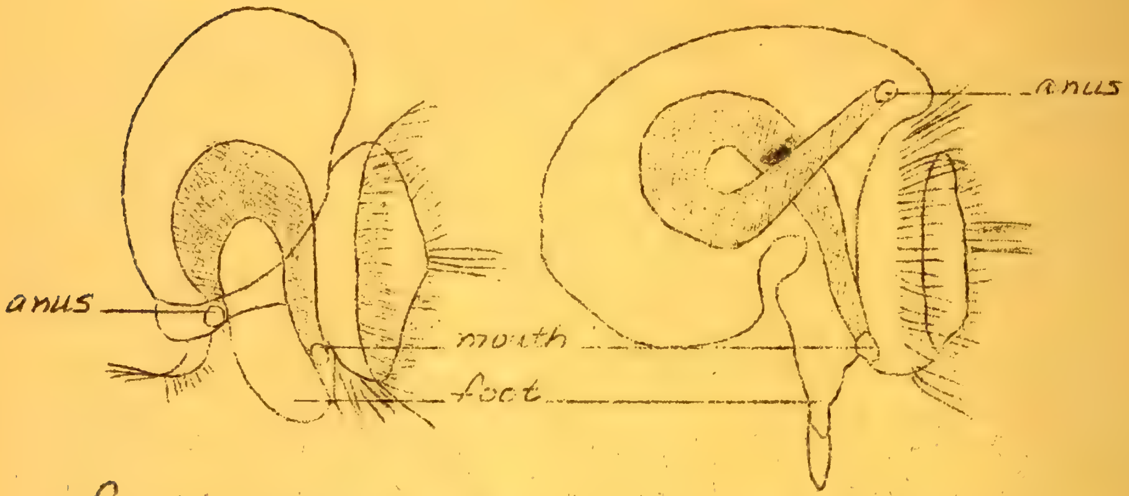

anus
mouth
foot
anus

fig. 21 Veliger larvae before and after rotation of the viscera (after Buchsbaum from Patton and Robert)

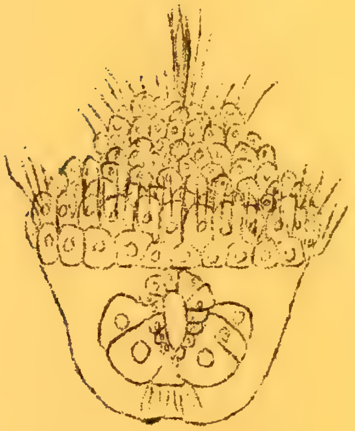


fig. 22 Trochophore (after Patten)

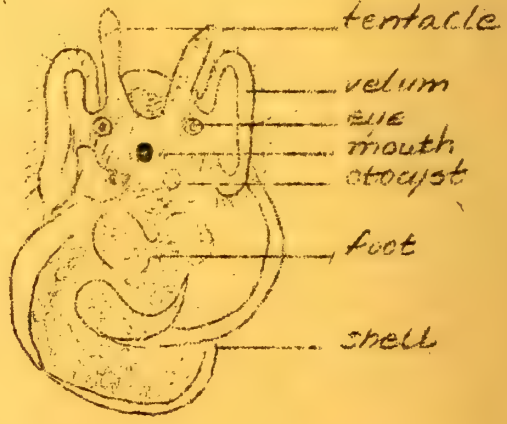

tentacle
velum
eye
mouth
otocyst
foot
shell

fig. 23 Veliger larva of Vermetus (after Patten)

PLATE

Paludina vivipara
(after Borradaile and Potts)

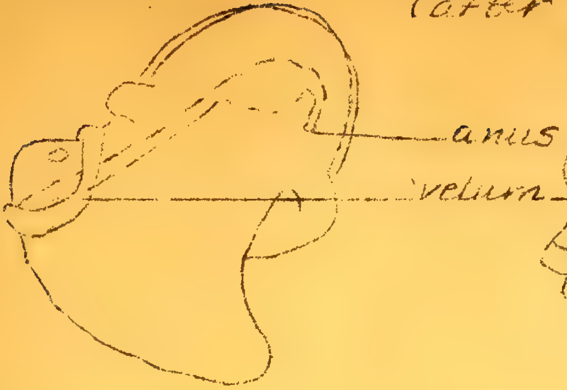


fig. 24 almost symmetrical
side view

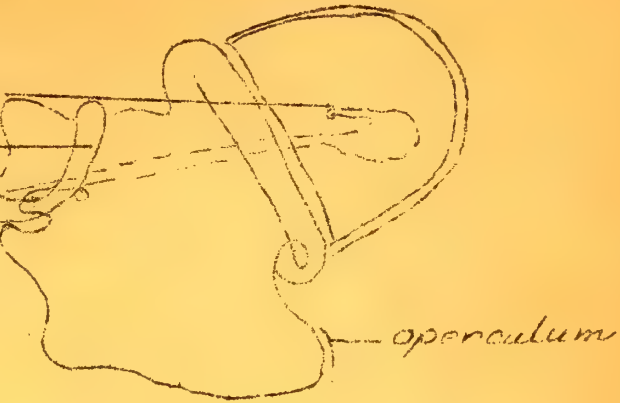


fig 25 showing 90°
torsion – side view

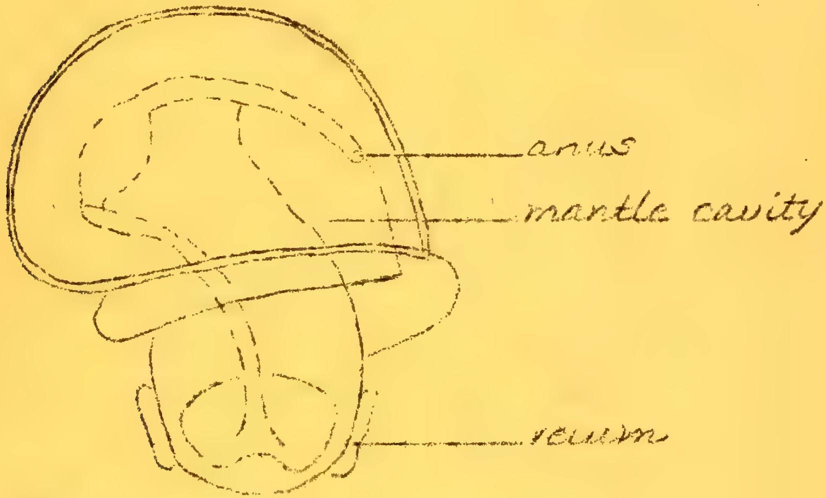

anus
mantle cavity
velum

fig. 26 about the same
as fig. 25 but rear view

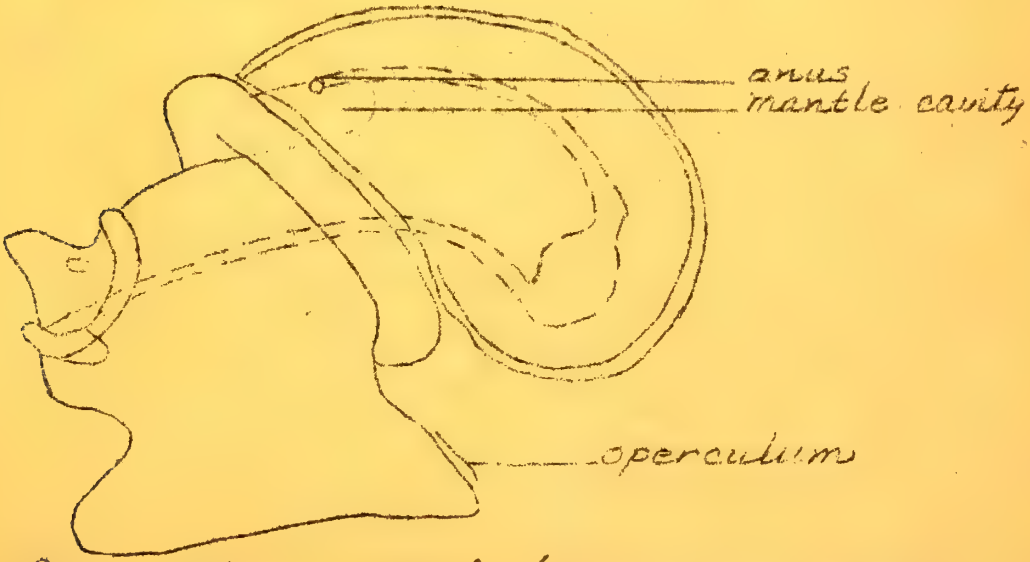

anus
mantle cavity
operculum

fig. 27 showing 180° torsion and adult position

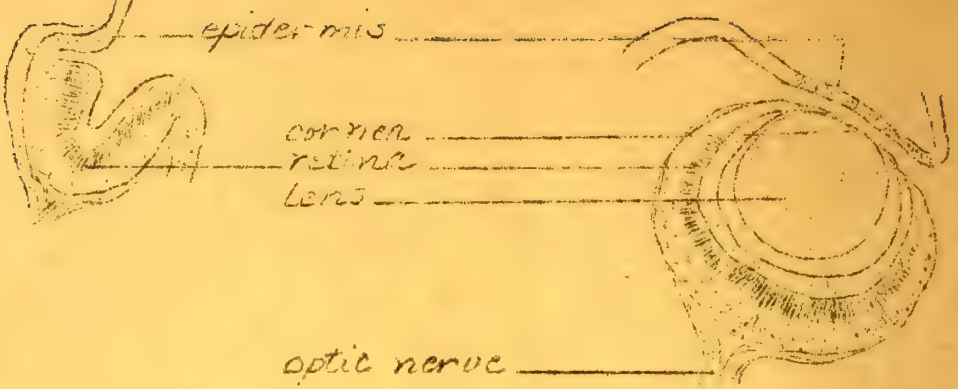

epidermis
cornea
retina
lens
optic nerve

fig. 28 Patella eye after Parker and Haswell

fig. 29 Murex eye after Helger

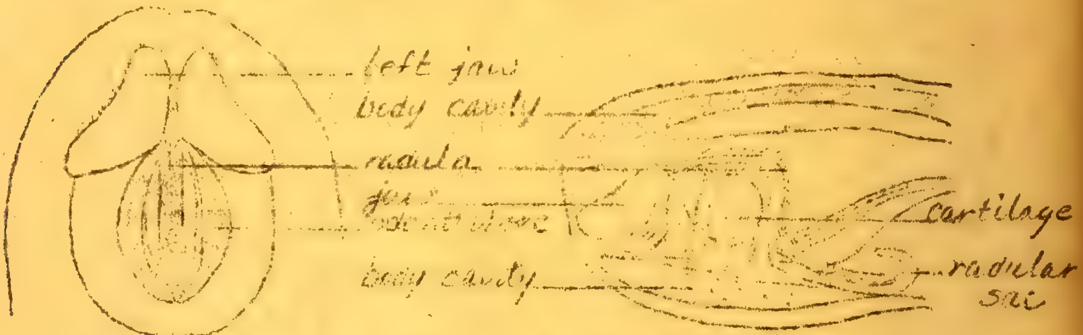

left jaw
body cavity
radula
jaw
odontophore
body cavity
cartilage
radular sac

fig. 30 interior of buccal mass — from above

fig. 31 Diagram of long. section thru buccal cavity

Triton rubicundus — after Parker and Haswe

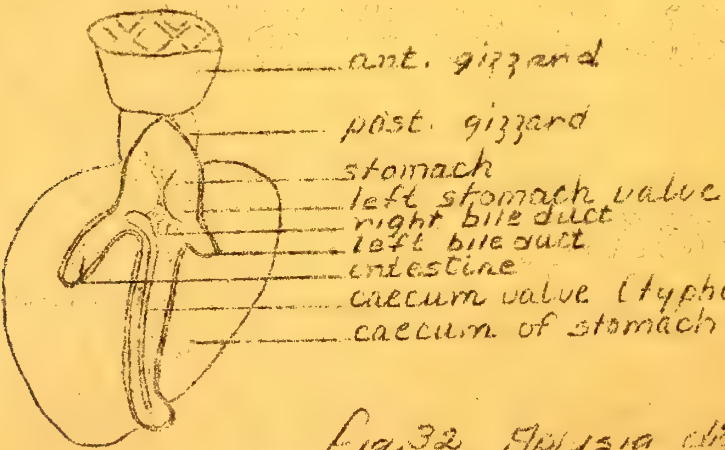

ant. gizzard
post. gizzard
stomach
left stomach valve
right bile duct
left bile duct
intestine
caecum valve (typhosole)
caecum of stomach

fig. 32 Aplysia digestive tract (detail) after Eales

GENITALIA

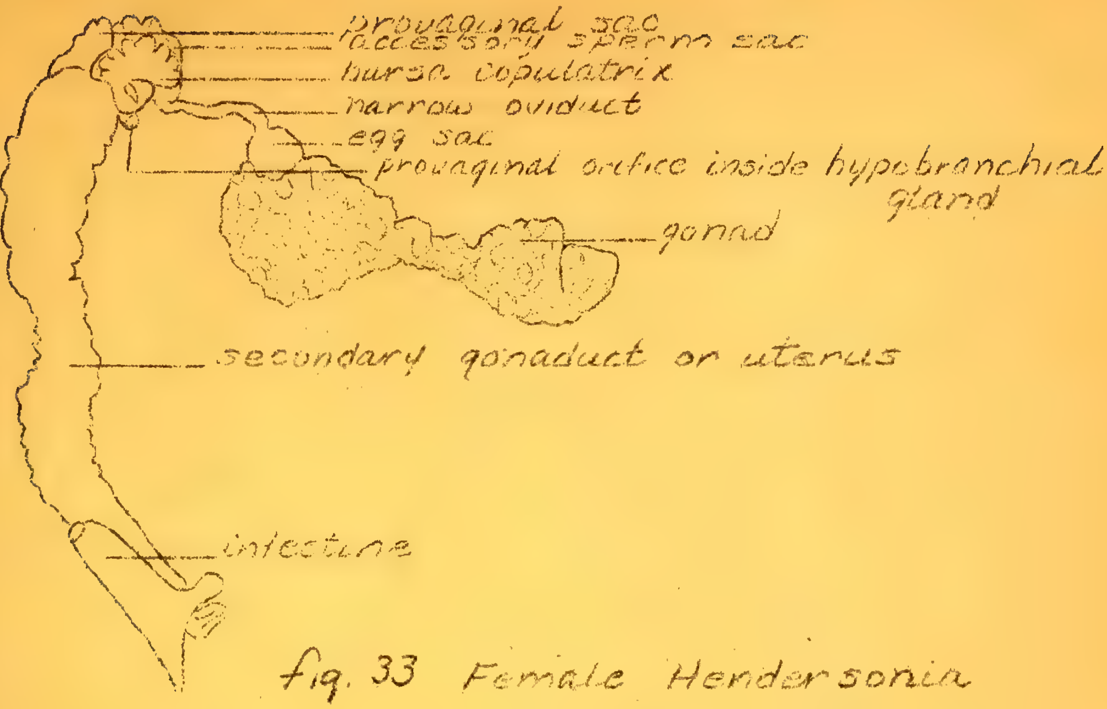

provaginal sac
accessory sperm sac
bursa copulatrix
narrow oviduct
egg sac
provaginal orifice inside hypobranchial gland
gonad
secondary gonaduct or uterus
intestine

fig. 33 Female Hendersonia

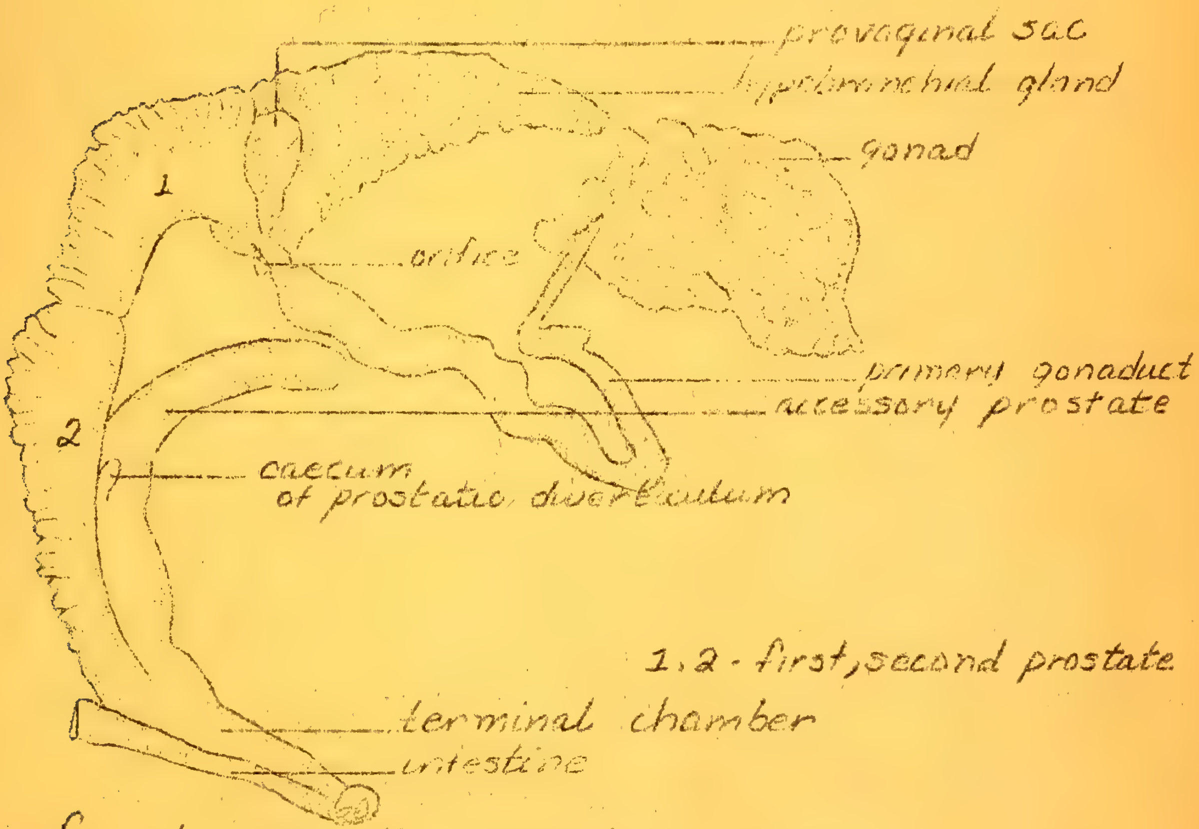

provaginal sac
hypobranchial gland
gonad
1
orifice
primary gonaduct
accessory prostate
2
caecum of prostatic diverticulum
1,2 - first, second prostate
terminal chamber
intestine

fig. 34 Male Hendersonia
both drawings after Baker

GENITALIA

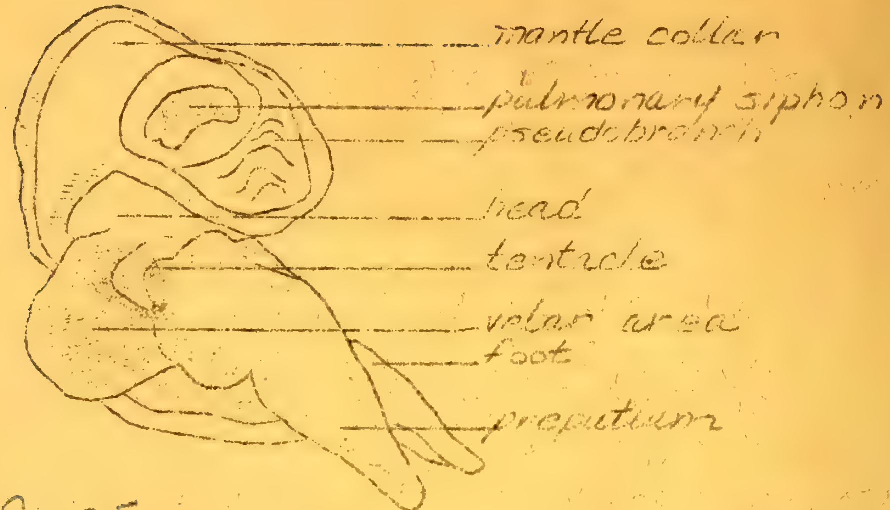

mantle collar
pulmonary siphon
pseudobranch
head
tentacle
velar area
foot
preputium

fig. 35 animal with preputium extended

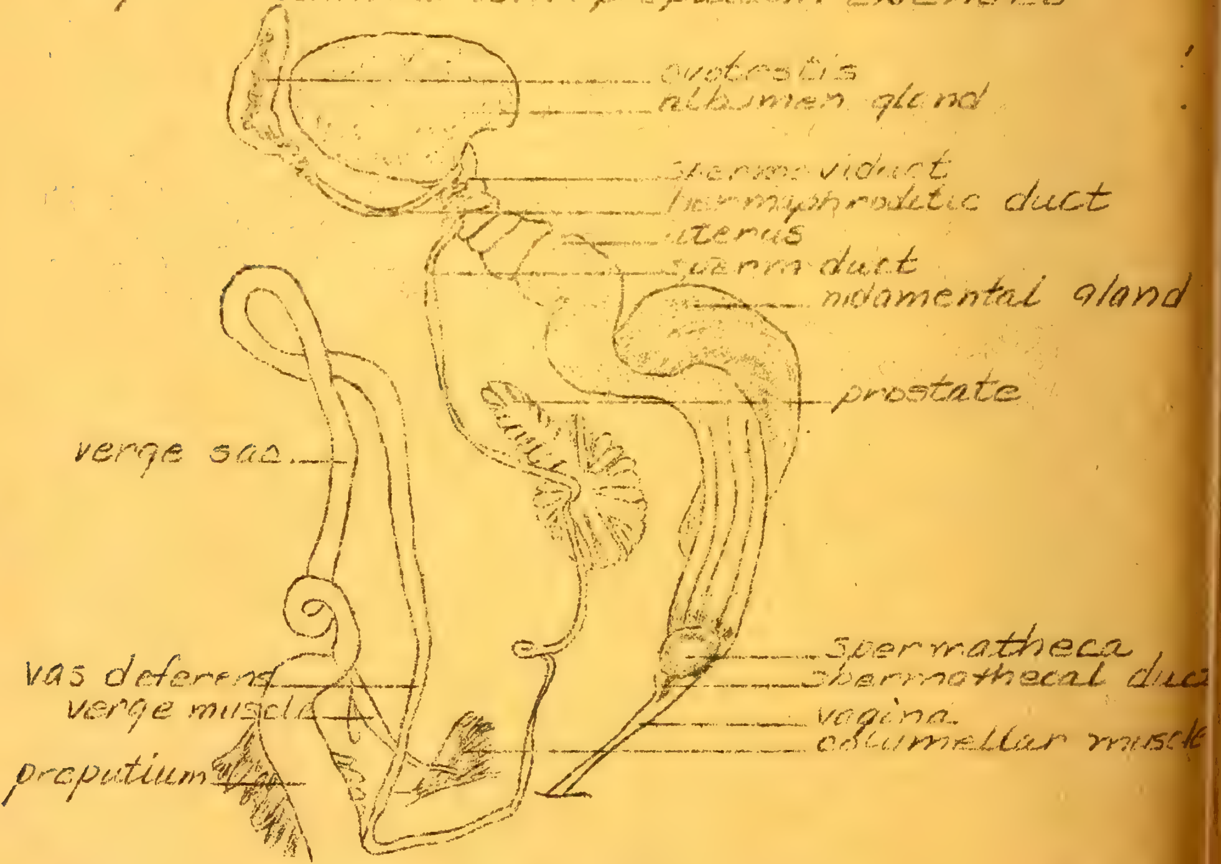

ovotestis
albumen gland
spermoviduct
hermaphrodetic duct
uterus
sperm duct
nidamental gland
prostate
verge sac
spermatheca
spermathecal duc
vagina
columellar muscle
vas deferens
verge muscle
preputium

fig. 36 Indoplanorbis exustus _
after Baker 1933

GENITALIA

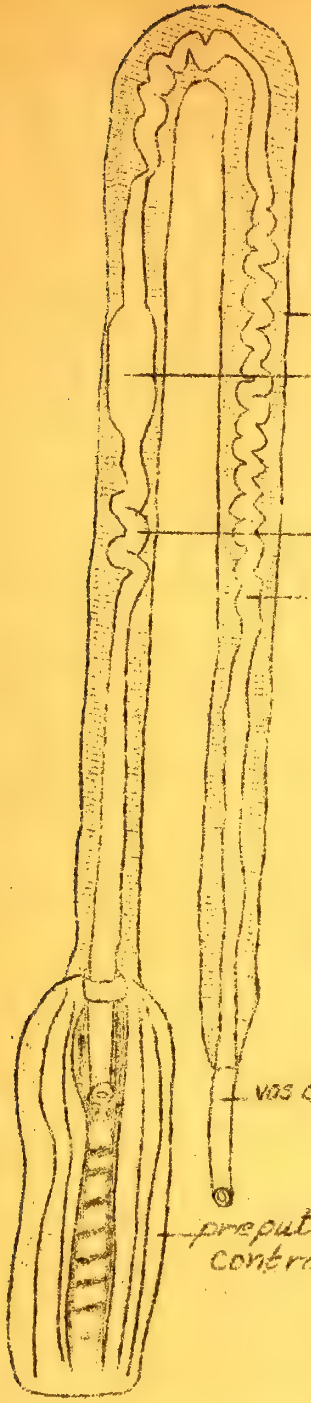

vergic sac
bulbous end of verge
verge
vas deferens
vas deferens
preputium contracted

fig. 37 natural position
after Baker 1933

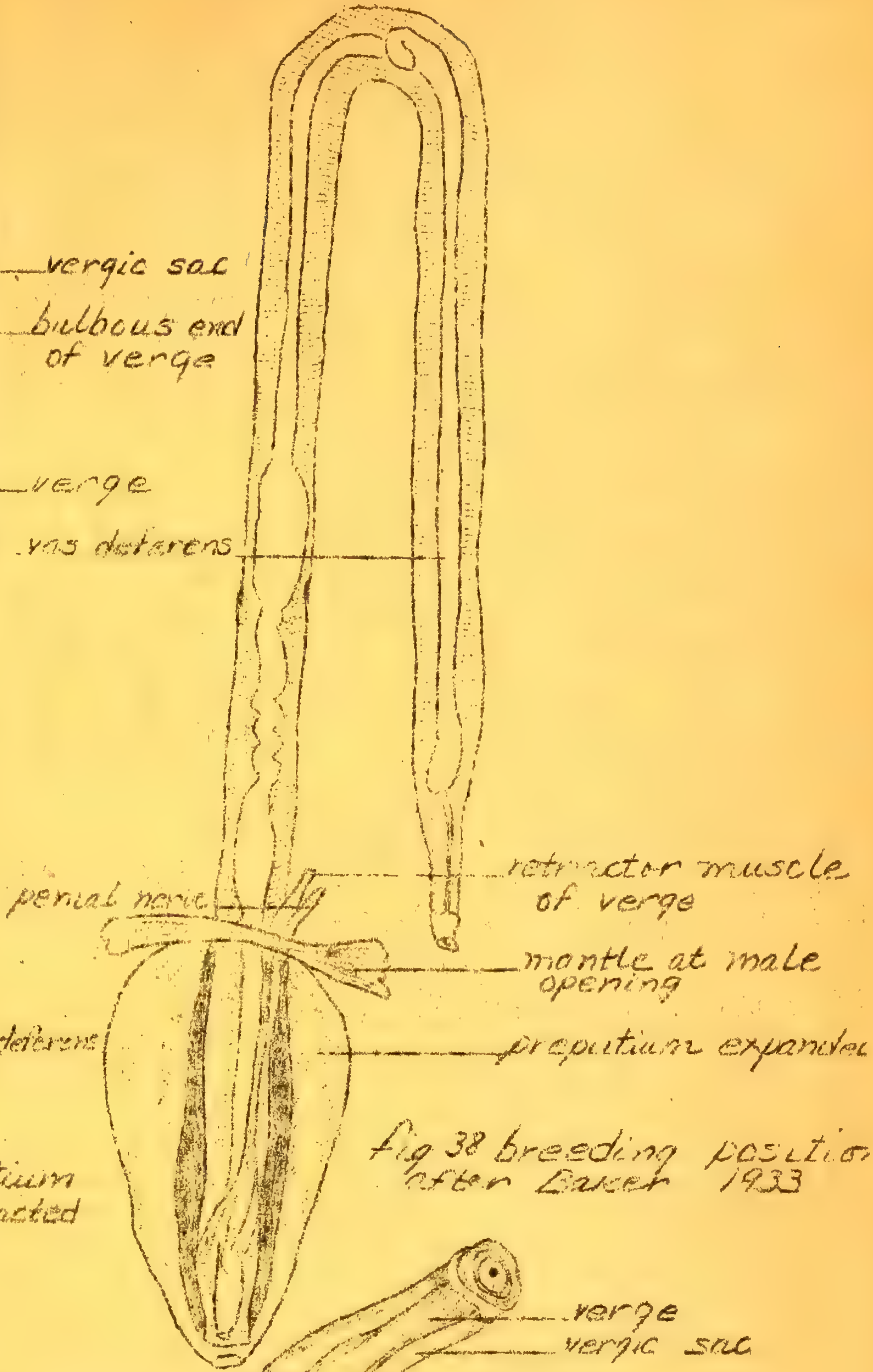

penial nerve
retractor muscle of verge
mantle at male opening
preputium expandec

fig 38 breeding position
after Baker 1933

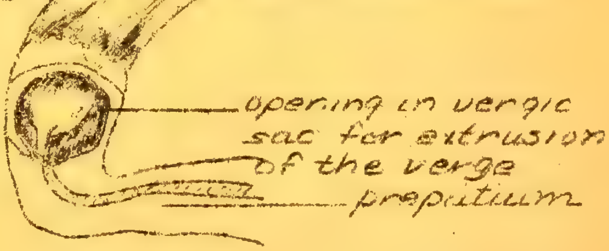

verge
vergic sac
opening in vergic sac for extrusion of the verge
preputium

fig. 39 portion of penis
after Baker 1933

HETEROPODA

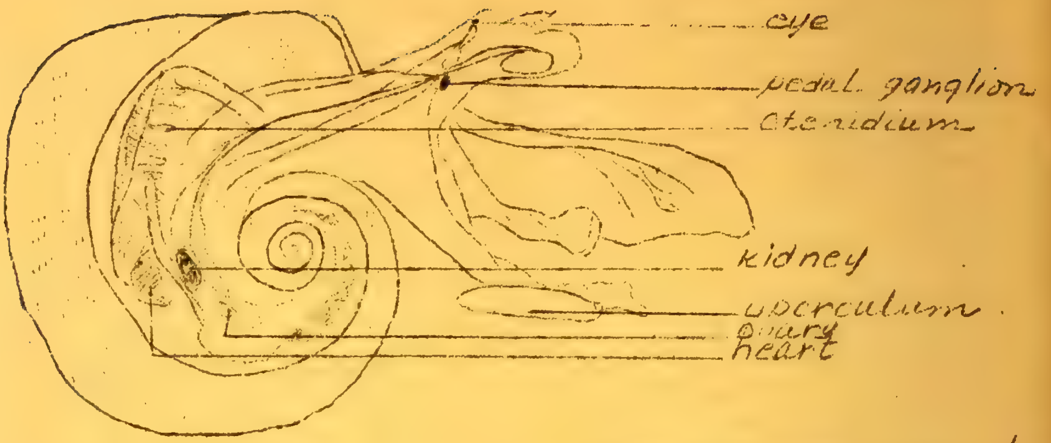

eye
pedal ganglion
ctenidium
kidney
operculum
ovary
heart

fig 40 Atlanta peronii — aftr Parker and Hasw

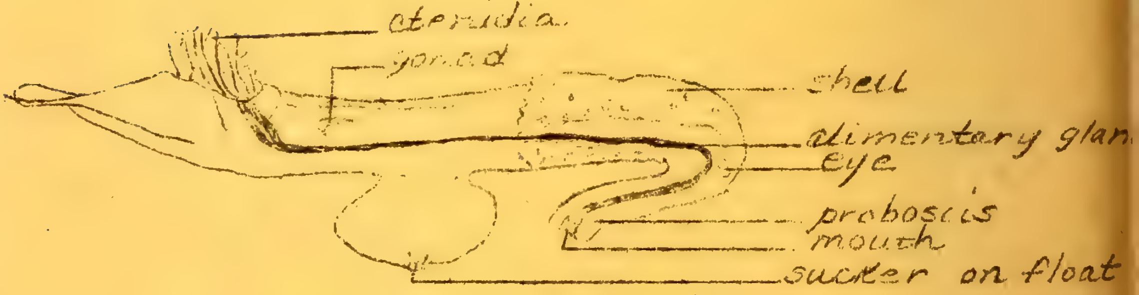

ctenidia
gonad
shell
alimentary glan
eye
proboscis
mouth
sucker on float

fig. 41 Pterotrachea scutata
after Parker and Haswell

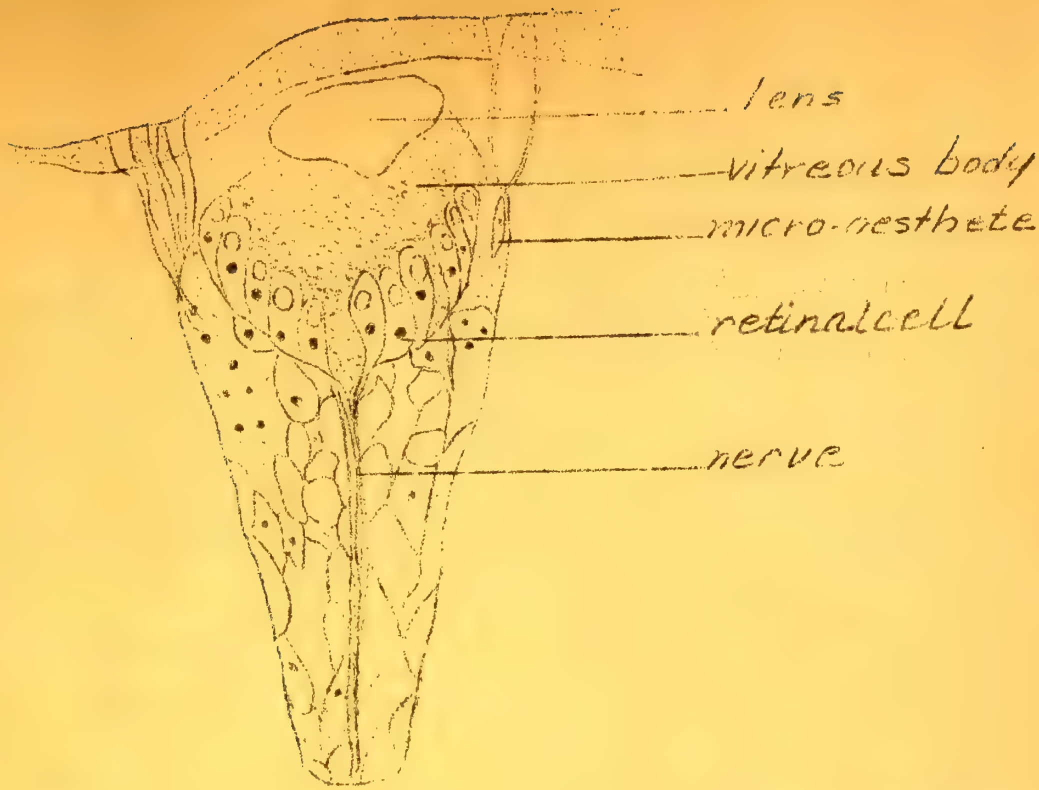

lens
vitreous body
micro-aesthete
retinalcell
nerve

fig. 42 Aesthete – eye after Parker + Haswell
after Nowikoff

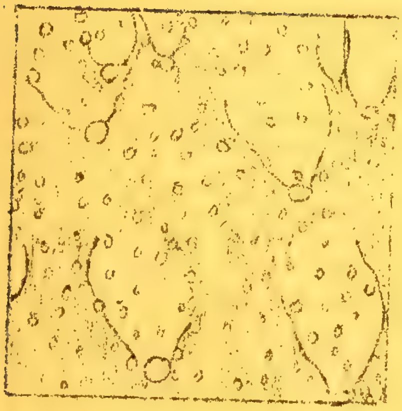


fig. 43-Katherina tunicata
(Wood) – after LeLoup
(x 260)
aesthetes

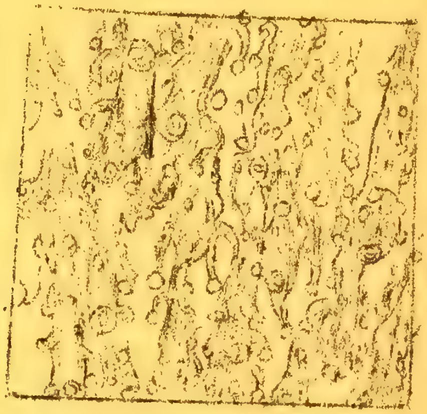


fig. 44-Mopalina pedroana
Willett
after LeLoup (X260)
aesthetes

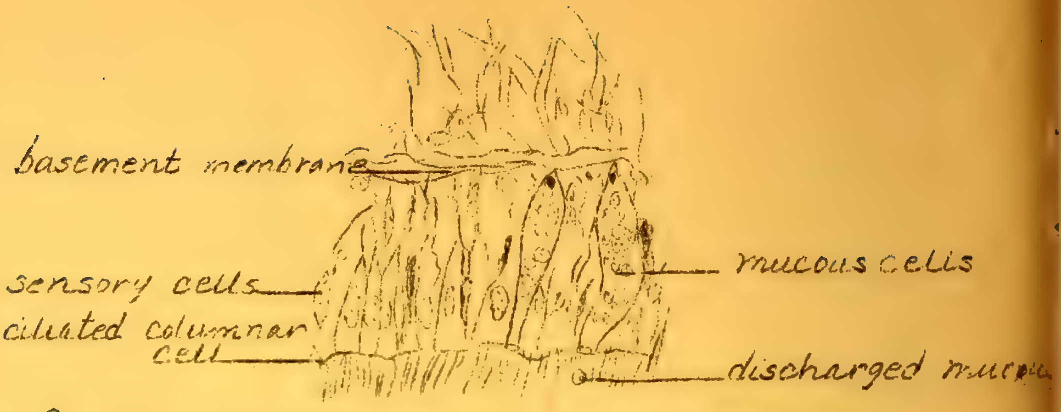

basement membrane
sensory cells
ciliated columnar cell
mucous cells
discharged mucou

fig 45 Pedal epithelium — Haliotis
after Crofts

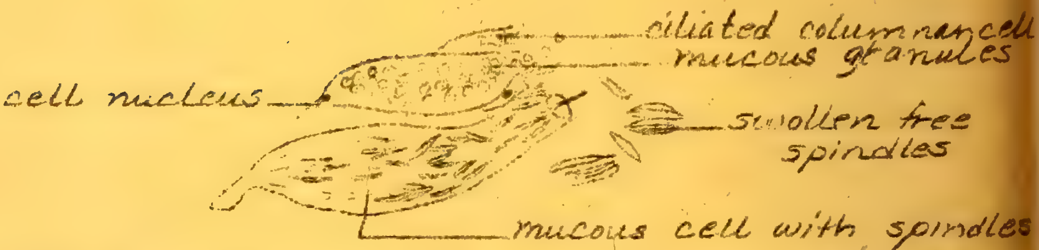

ciliated columnar cell
mucous granules
cell nucleus
swollen free spindles
mucous cell with spindles

fig 46 - Hypobranchial gland cells showing
two types of mucus
Haliotis — after Crofts

APLYSIA

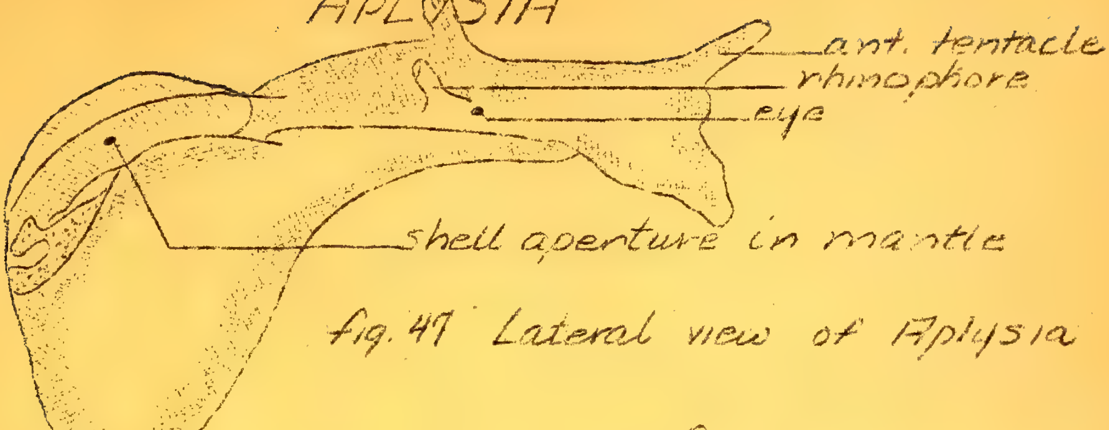

ant. tentacle
rhinophore
eye
shell aperture in mantle

fig. 47 Lateral view of Aplysia

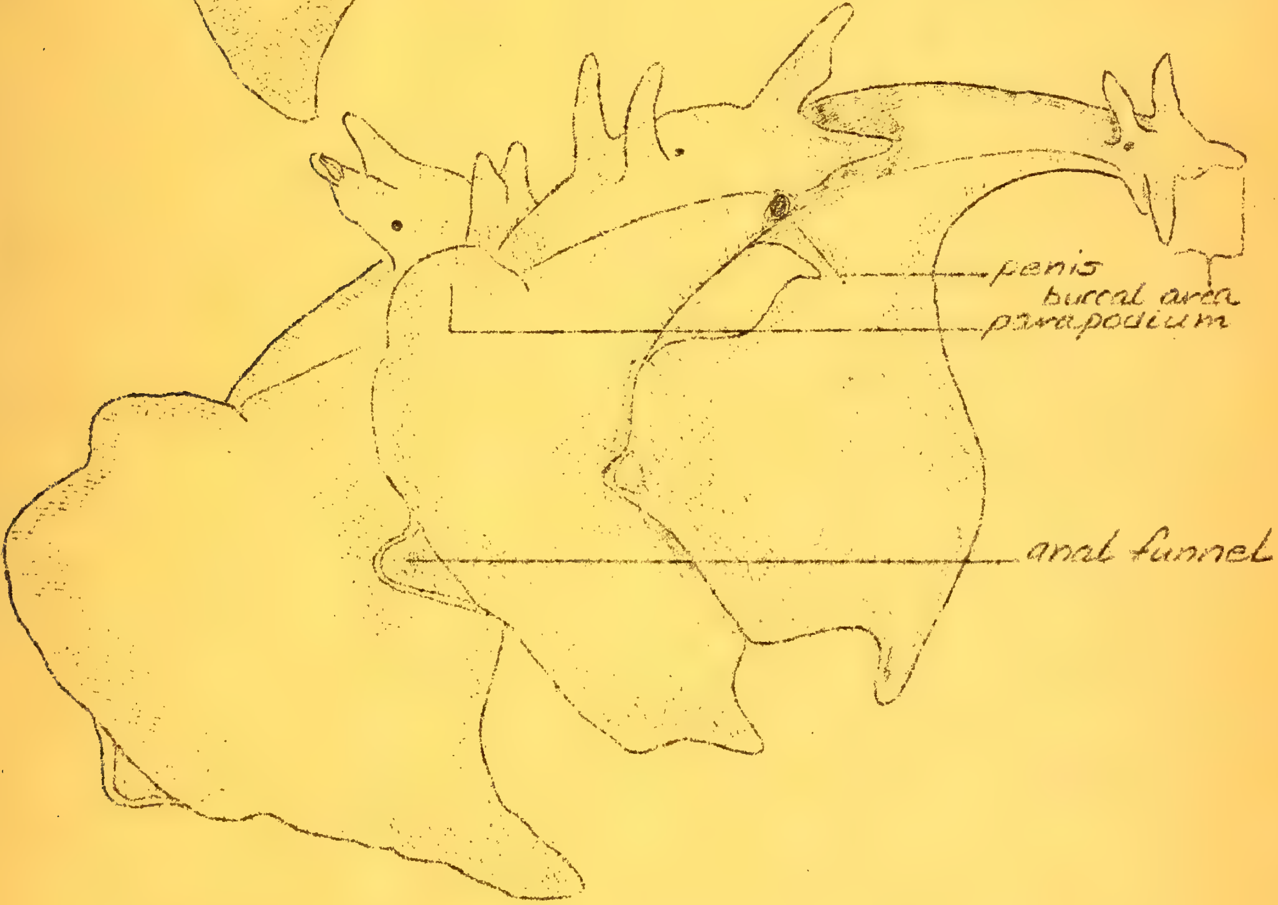

penis
buccal area
parapodium
anal funnel

fig. 48 Three Aplysias copulating after Eales

APERTURES

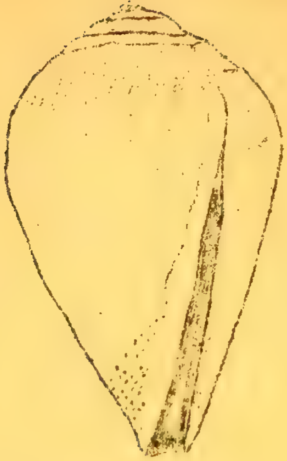


fig. 49 narrow — Conus californicus Hinds

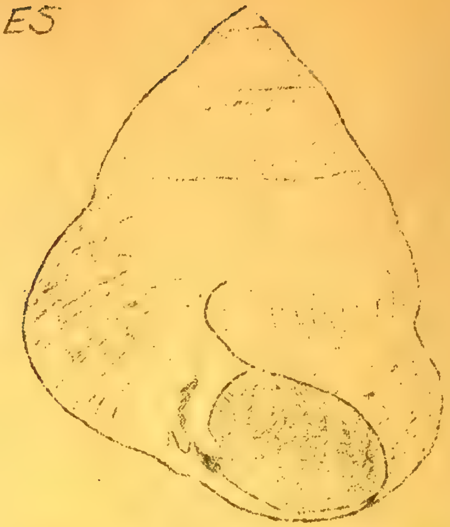


fig. 50 Tegula gallina (Forbes)

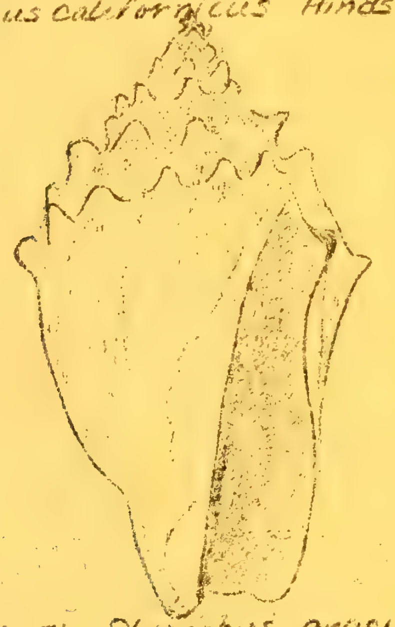


fig. 51 Strombus gracilior Sow

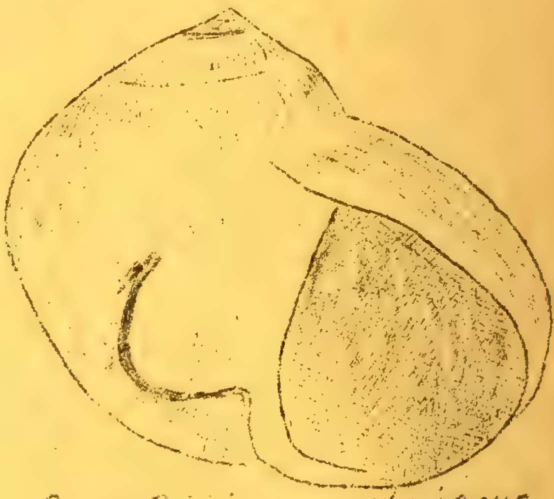


fig. 52 Polinices reclusianus Des.

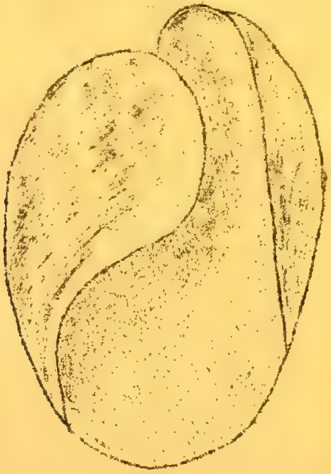


fig. 53 Vesica gouldiana (Pils.)

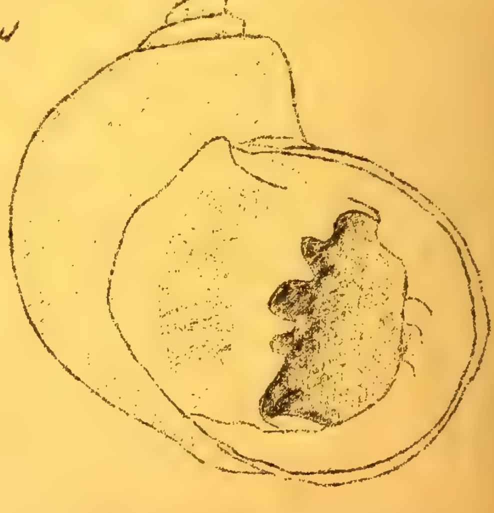


fig. 54 serrated Nerita scabricostata Lam.

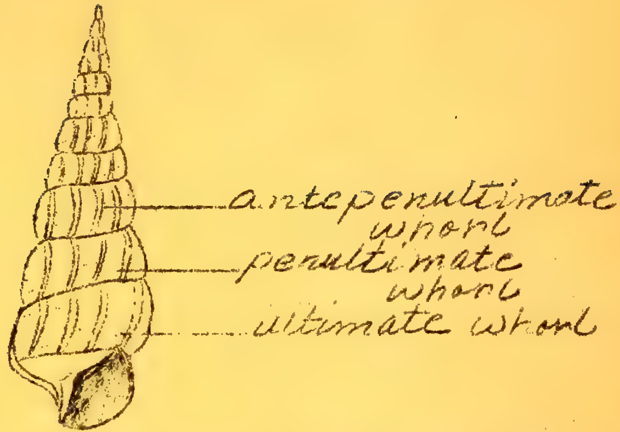

antepenultimate whorl
penultimate whorl
ultimate whorl

fig. 56 Cerithidea californica Hal

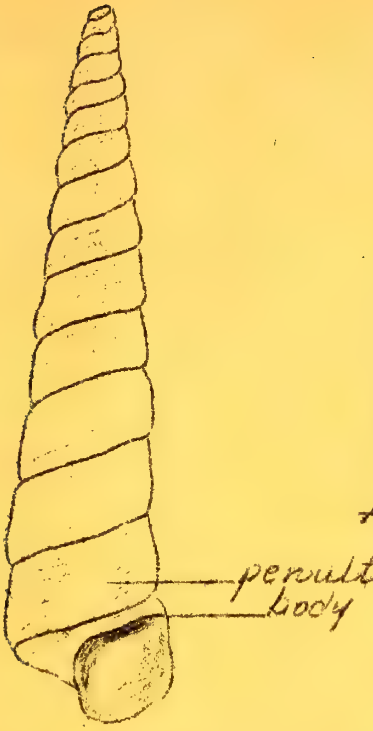

penultimate
body whorl

fig. 55 Turritella goniostoma Val.

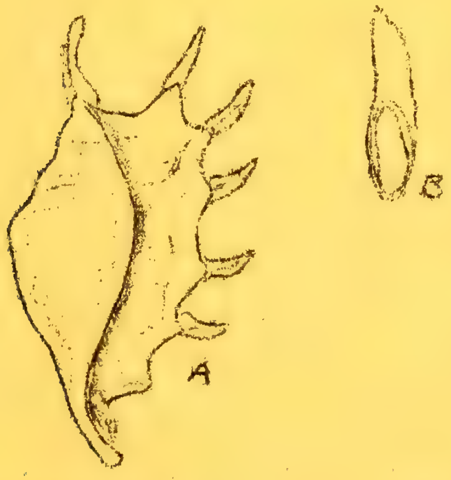


fig. 57 Harpa lambis Q.G.
aft. A Adams
A. Shell B. operculum

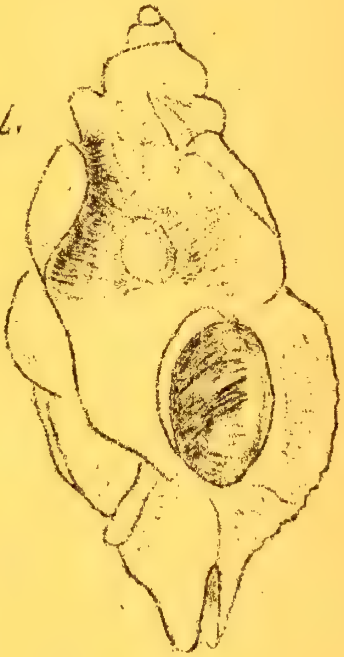


fig. 58 Purpura

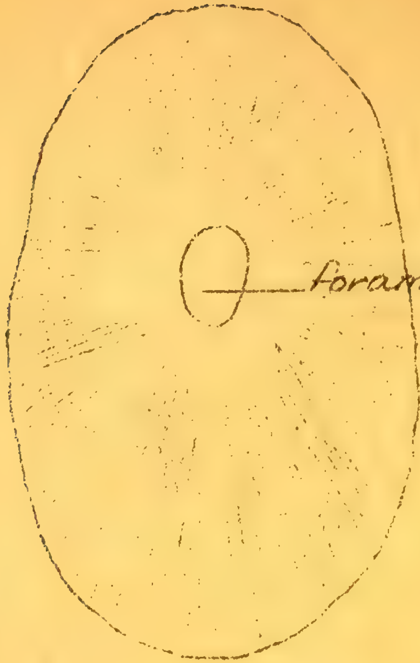


fig.59 Megathura Crenulata
Sowerby

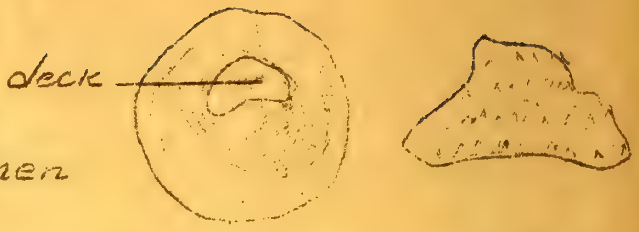


fig. 60 Crucibulum spinosum
Sowerby

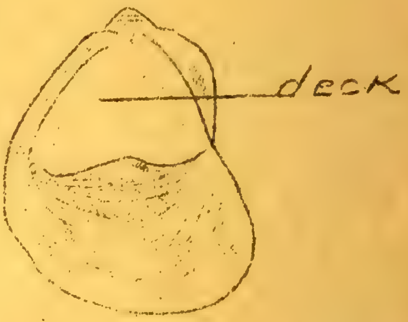


fig. 61 Crepidula onyx Sowerby

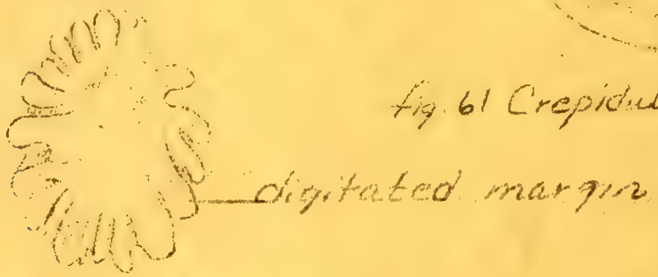

digitated margin

fig. 62 Acmaea scabra (Gould)

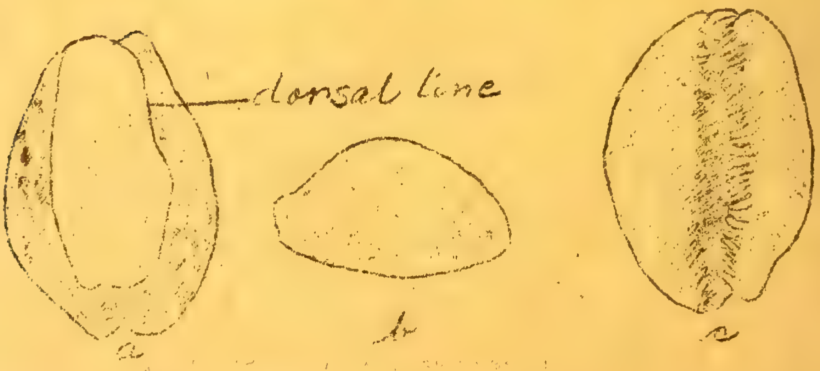

dorsal line
a
b
c

fig. 63 Zonaria robertsi Hidalgo
a = dorsal b = lateral c = ventral

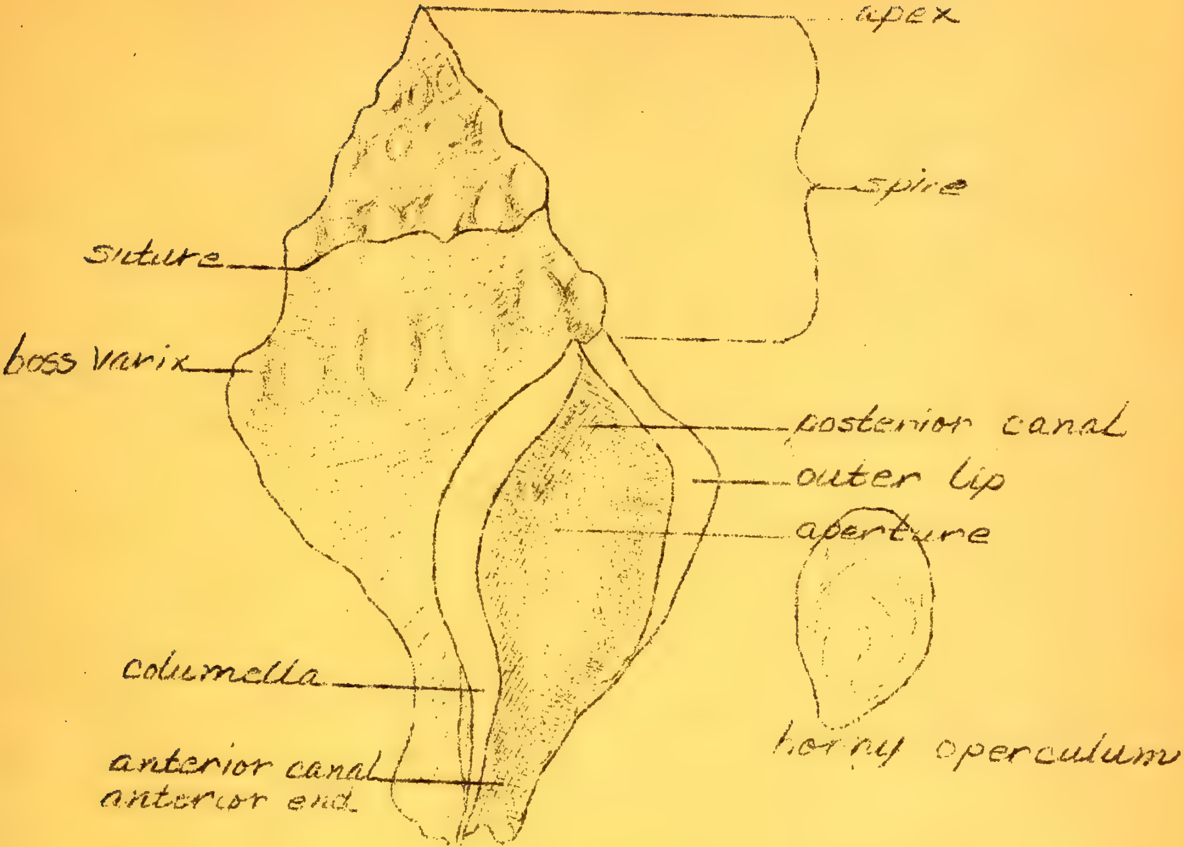

apex
spire
suture
boss varix
posterior canal
outer lip
aperture
columella
anterior canal
anterior end
horny operculum

fig. 64 Kellettia kellettii Forbes

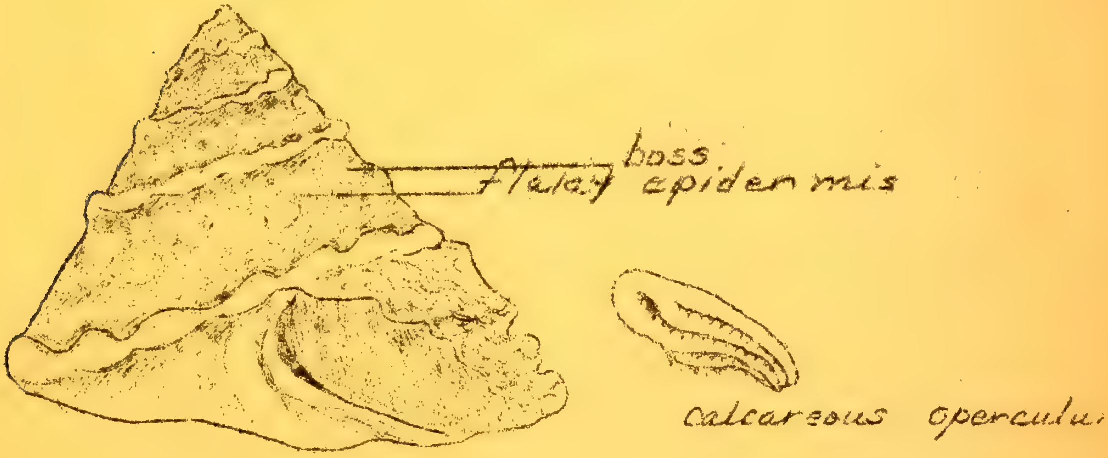

boss
Flaky epidermis
calcareous operculu

fig. 65 Astraea undosa Wood

MODIFICATIONS

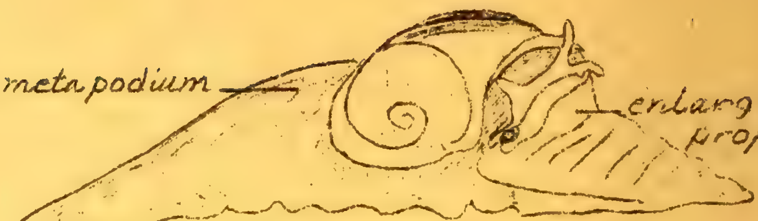

enlarged metapodium
enlarged propodium

fig. 66 Sigaretus laevigatus (burrowing)
after Parker and Haswell

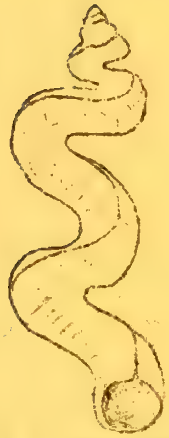


fig. 67 Tenagoda anguina
after A. Adams
worm-like

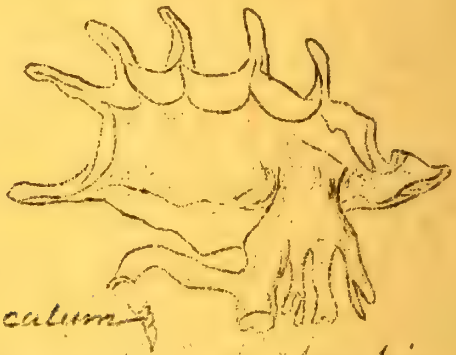


fig. 68 Harpago lambis Quoy & G
after H. Adams —
modified for protectio

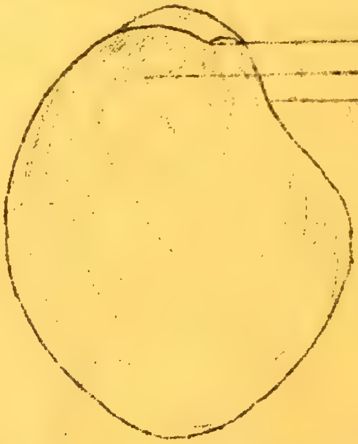

rostrum
liver concavity
anus insertion

fig. 69 inner shell of Aplysia
after Eales

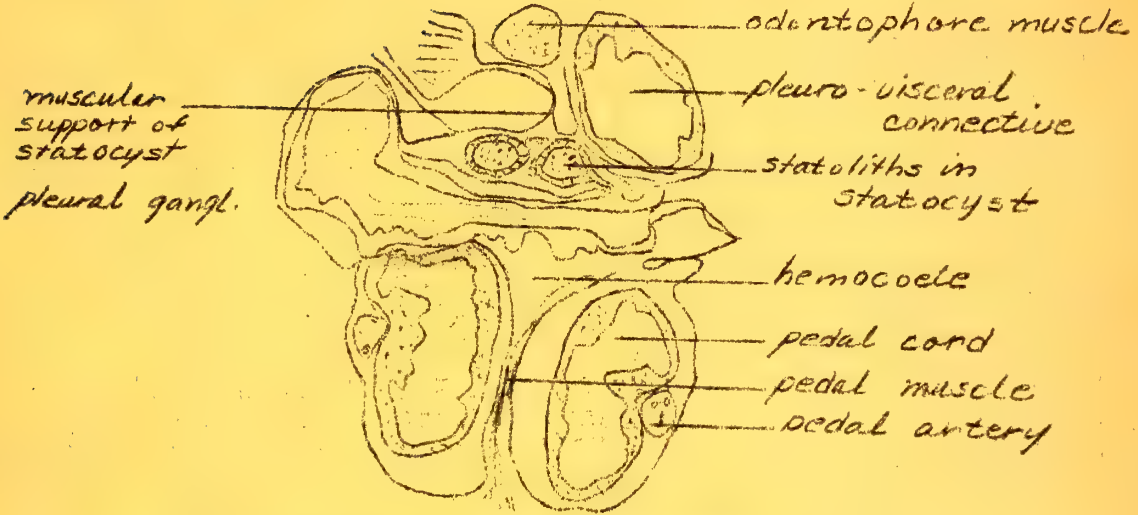

odontophore muscle
muscular support of statocyst
pleuro-visceral connective
statoliths in statocyst
pleural gangl.
hemocoele
pedal cord
pedal muscle
pedal artery

fig. 70 Cross section at statocyst region of Haliotis — after Crofts

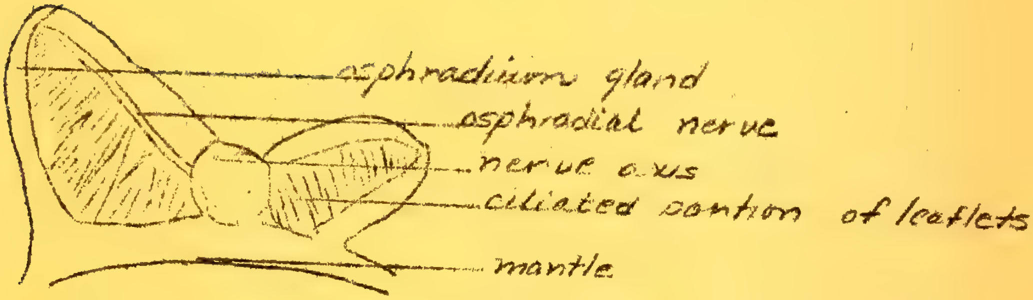

osphradium gland
osphradial nerve
nerve axis
ciliated portion of leaflets
mantle

fig. 71 cross section of osphradium of Buccinum — after Dakin

NERVOUS SYSTEM of GASTROPODS

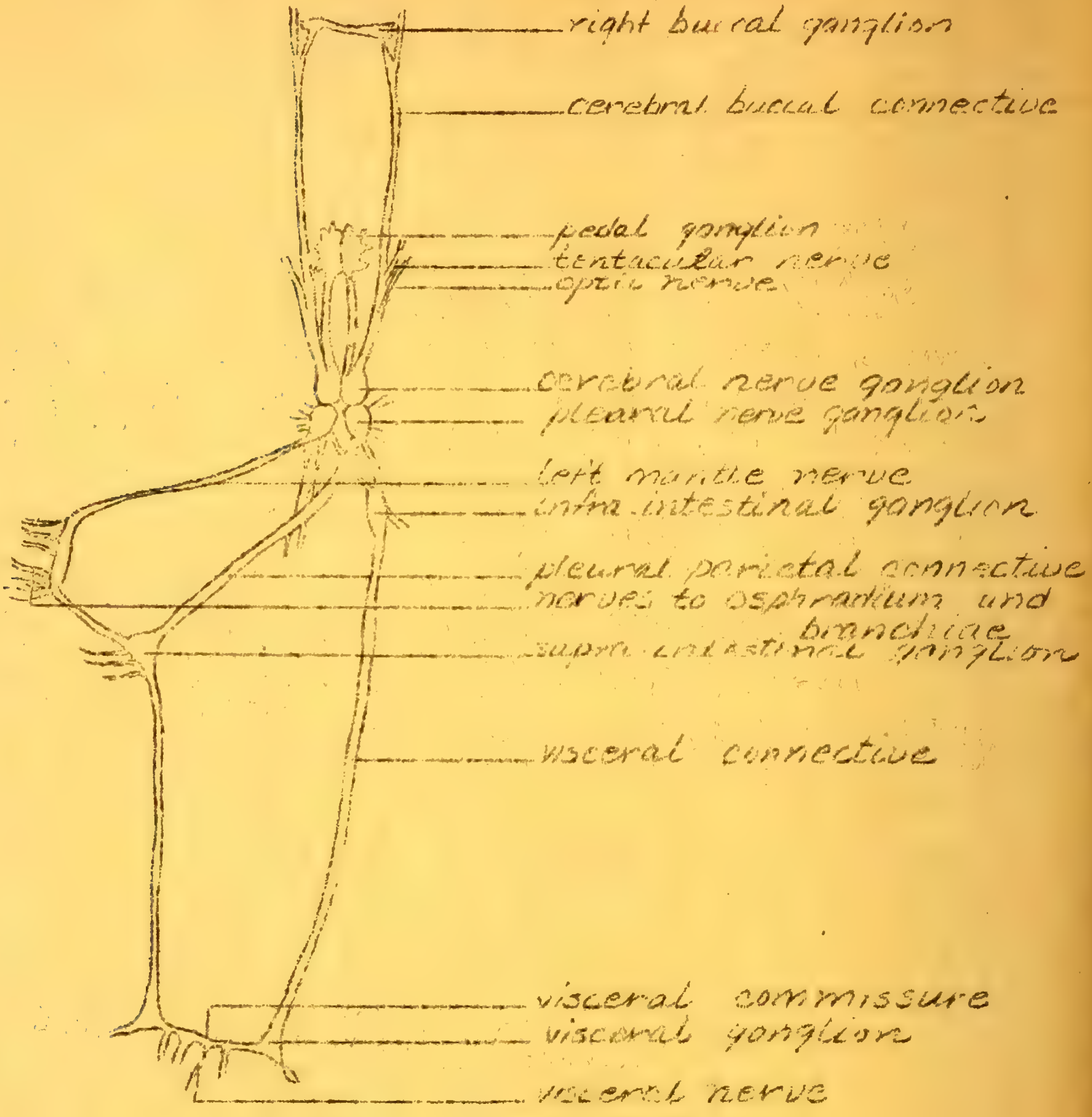

right bucal ganglion
cerebral bucal connective
pedal ganglion
tentacular nerve
optic nerve
cerebral nerve ganglion
pleural nerve ganglion
left mantle nerve
infra intestinal ganglion
pleural parietal connective
nerves to osphradium and branchiae
supra intestinal ganglion
visceral connective
visceral commissure
visceral ganglion
visceral nerve

fig. 72 Triton rubicundus _
after Parker and Haswell

OPERCULA

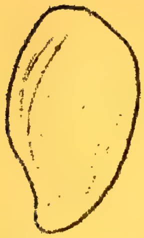


fig. 73 horny
Kellettia kelletii Forbes

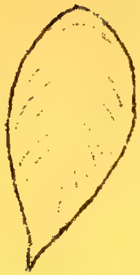


fig. 74 terminal
Pyrula

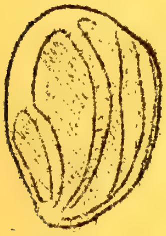


fig. 75 terminal calcareous
Astraea undosa Wood

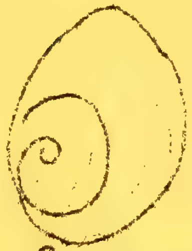


fig. 76 paucispiral horny
Littorina

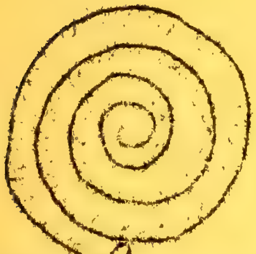


fig. 77 concentric
Aulopoma

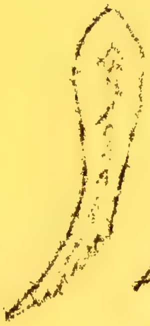


fig. 78 serrated
Strombus

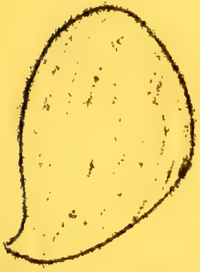


fig. 79 lateral
Purpura

PTEROPODA

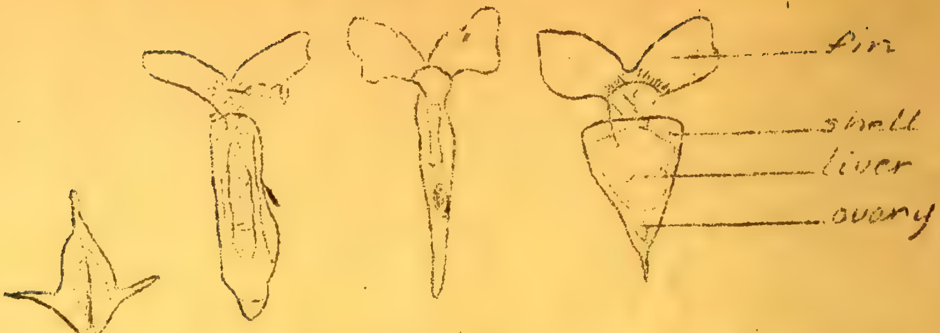


fig. 80 shell bearing pteropods
after Parker and Hasw

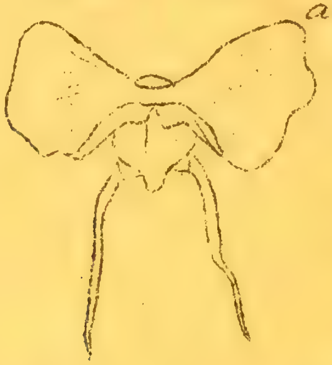


fig. 81 Cavolina tridentata A. Adams
after A. Adams

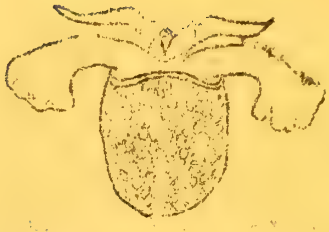


fig. 82 Euribia gaudichaudii
Ey. and Soul.
after A. Adams

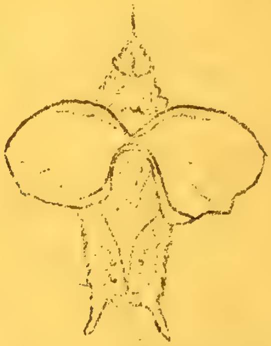


fig. 83 Cymbulia probosci
A. Adams
after A. Adams

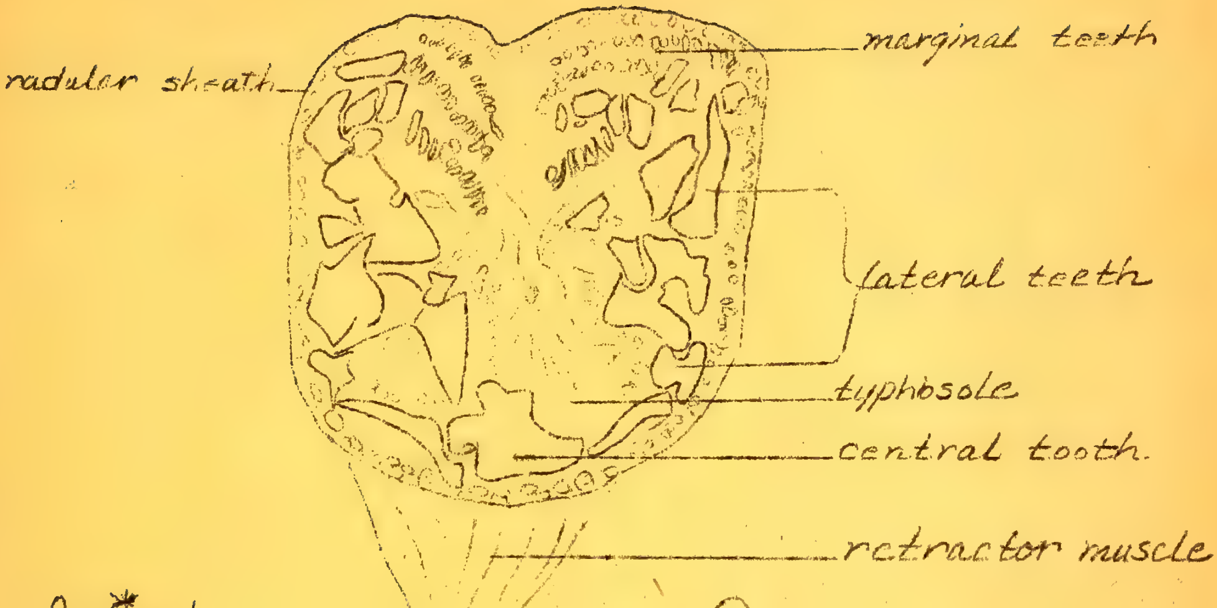

radular sheath
marginal teeth
lateral teeth
typhosole
central tooth.
retractor muscle

fig.*84

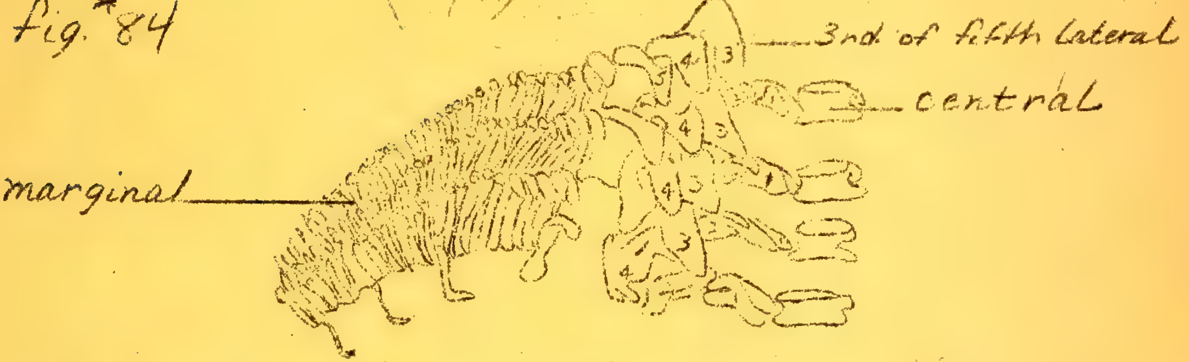

3nd of fifth lateral
central
marginal
4
3

fig. 85 Diagram of half of Haliotis radula
Dorsal view — x25 — after Crofts

* Diagram of cross section of radular caecum showing how the typhlosole breaks down to roll out radula of Haliotis — after Crofts

RADULAS

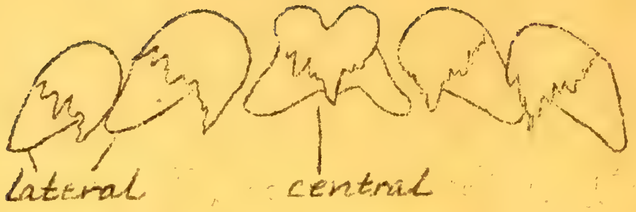
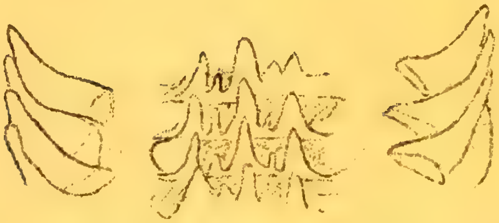


fig.86 Posterior view of five teeth
Aplysia — after Eales



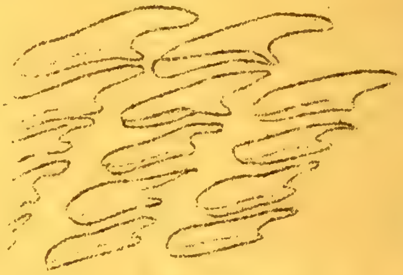


fig.87 Murex regius Lam.   fig.88 Ianthina communis La
after Cooke, Shipley and Reed

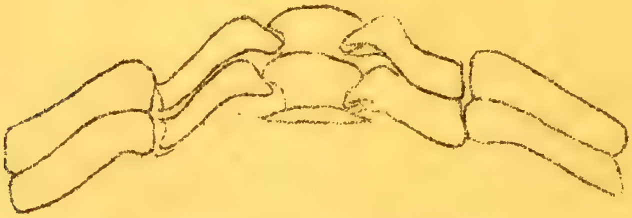


fig. 89 Dentalium entalis Lin.

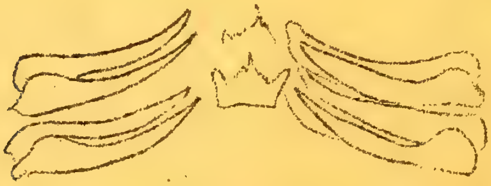


fig. 90 Pterotrachea mutica Les.

REPRODUCTIVE SYSTEM

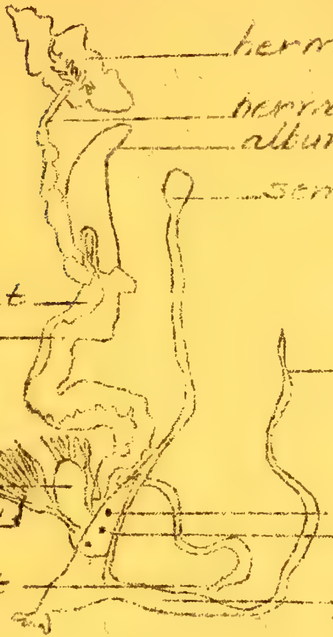

hermaphroditic gland
hermaphroditic duct
albumen gland
seminal receptacle
sperm duct
oviduct
flagellum of [illegible]n penis
dart sac
mucous gland
oviducal aperture
mucous duct apertu
sperm duct
penis

fig. 91 Helix reproductive system after Parker and Haswell after Pelseneer

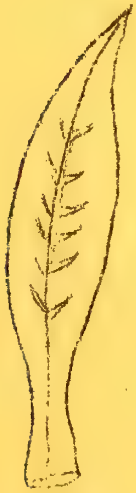


fig. 92 Dart of Helix aspera aft. Cooke, Shipley & Reed

RESPIRATION

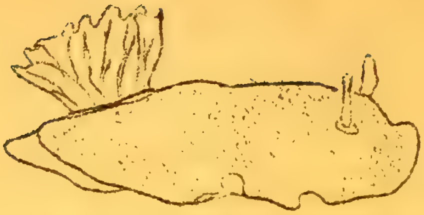


fig. 93 Doris johnsonia A+H.
after Johnson and Snook

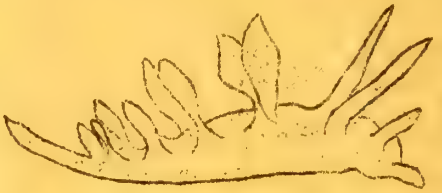


fig. 94 Coryphella landsburgii A+H.
after - Adams + Adams

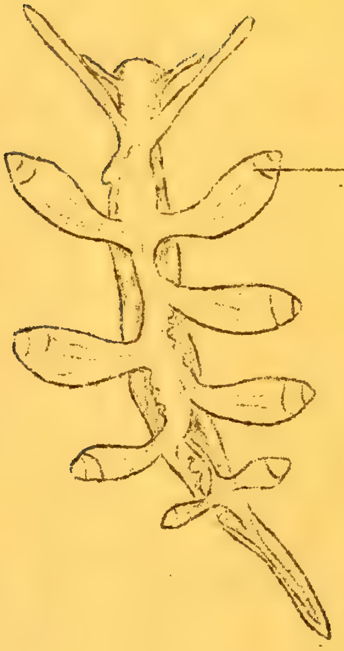


fig. 75 Aeolis despecta Johnst.

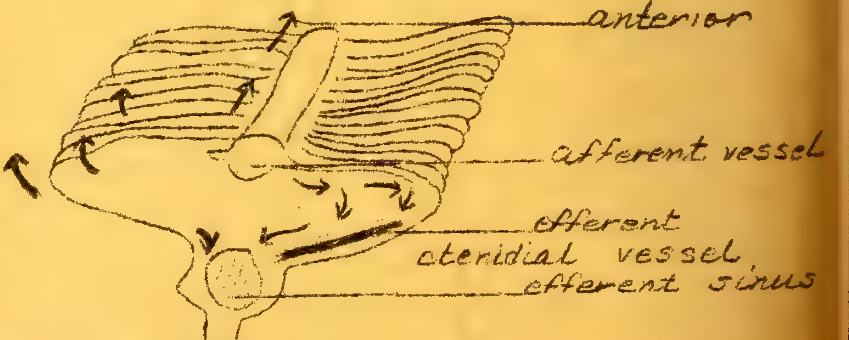

anterior
afferent vessel
efferent
ctenidial vessel
efferent sinus

fig 96 Diagram after Crofts
ciliary flow on left -
blood flow on right

SCAPHOPODA

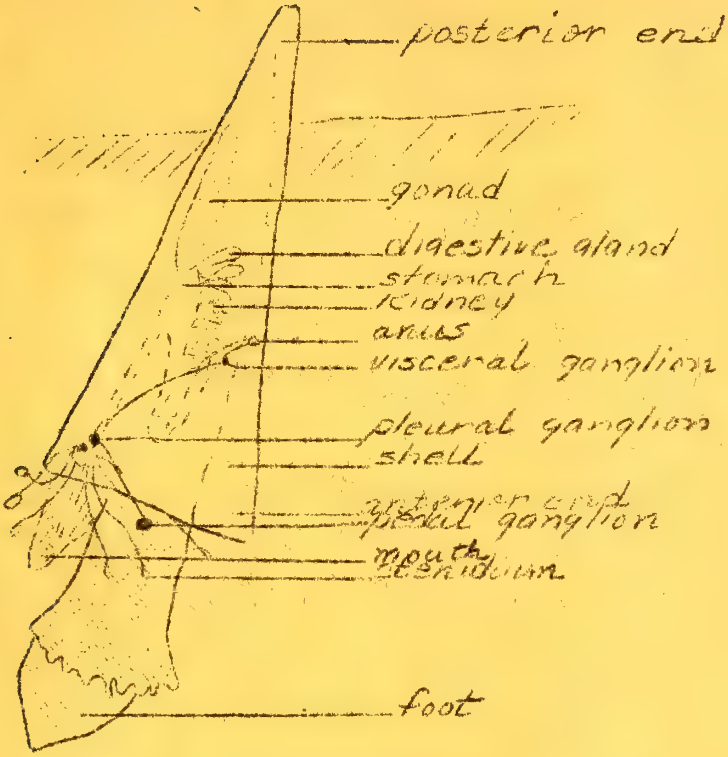

posterior end
gonad
digestive gland
stomach
kidney
anus
visceral ganglion
pleural ganglion
shell
anterior end
pedal ganglion
mouth
ctenidium
foot

fig. 97 anatomy — after Borradaile & Potts

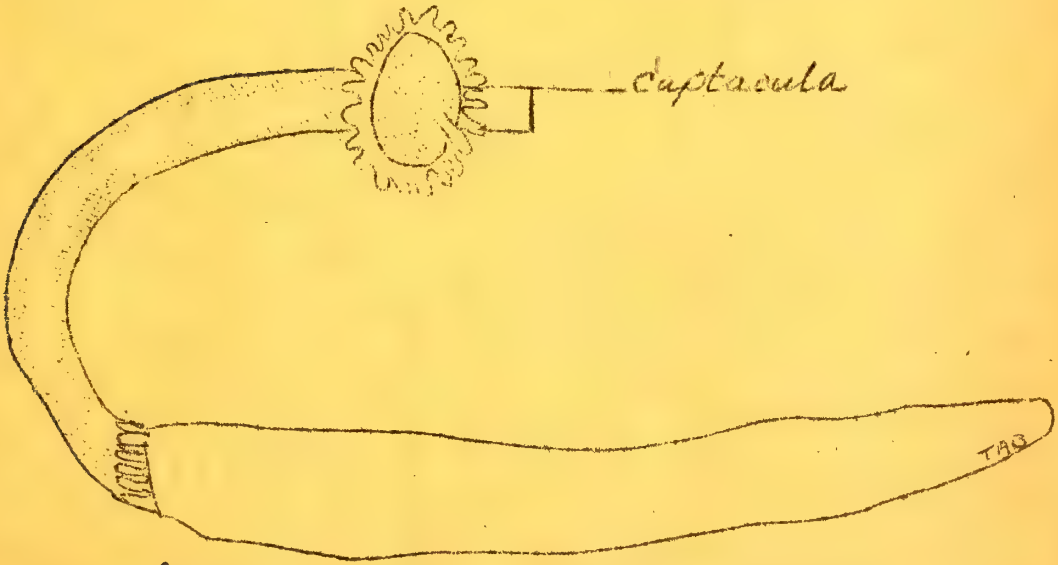

captacula
TAB

fig. 98 Siphonodentalium (TAB)

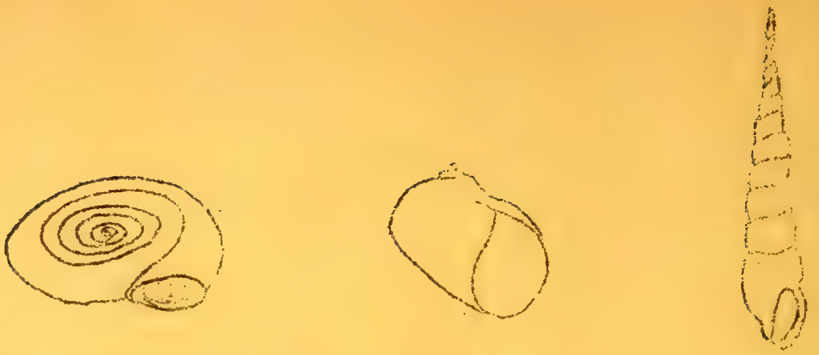


fig.99 Flattened (depressed) Polygyratia — globose Natica — subulate Terebra

after Cooke, Shipley and Reed

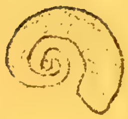
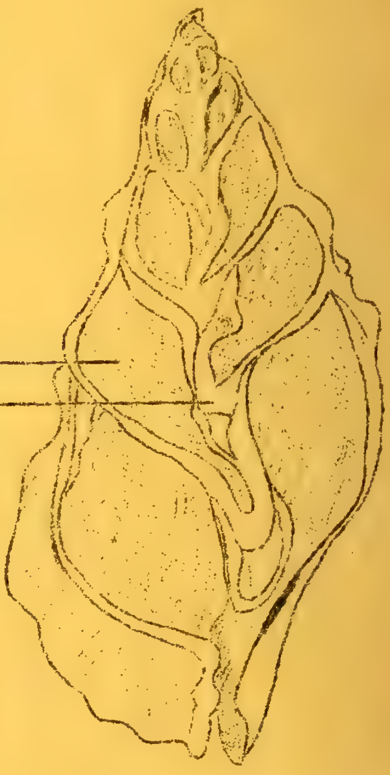


fig. 100 disconnected whorl
Cyathopoma cornu


whorl
columella

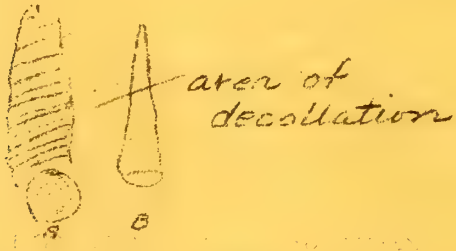

area of decollation
A
B

fig. 101 decollated spire
Cylindrella nobilior Adams
A = adult B = juvenile

fig. 102 Triton rubicundus
cut to show columella
after Parker & Haswell

SYMMETRY
(After Parker and Haswell)

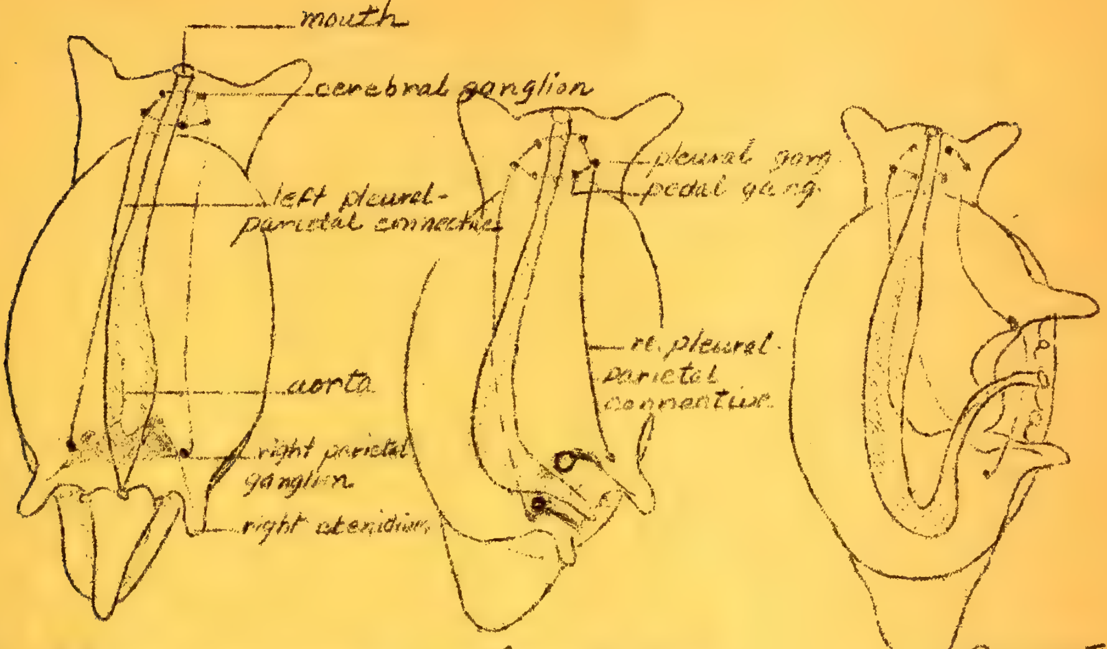

mouth
cerebral ganglion
left pleural-parietal connective
aorta
right parietal ganglion
right ctenidium
pleural gang.
pedal gang.
rt. pleural-parietal connective
P

fig. 103 near symmetry   fig. 104 less   fig. 105

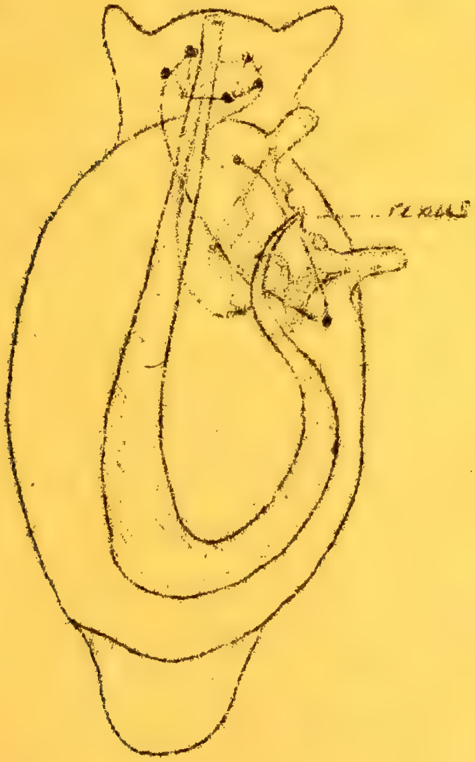


fig. 106

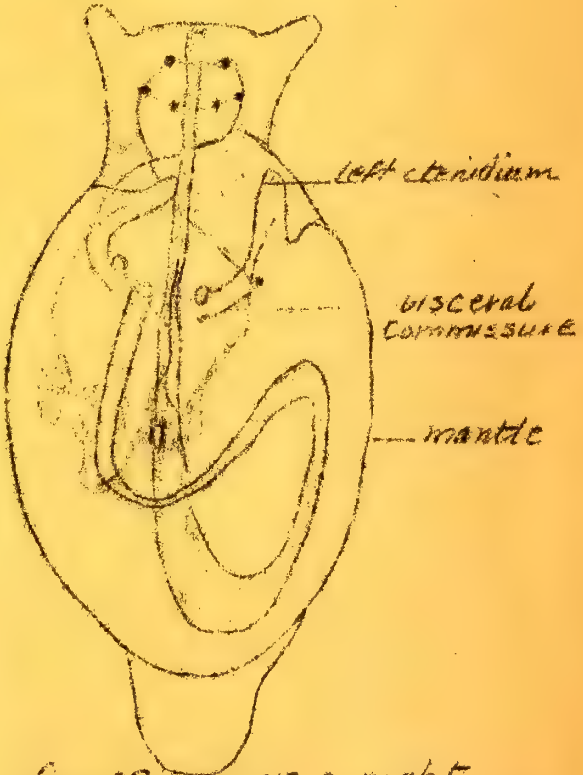

left ctenidium
visceral commissure
mantle

fig 107 anus & right ctenidium have passed the mid-line

BUCCINUM—

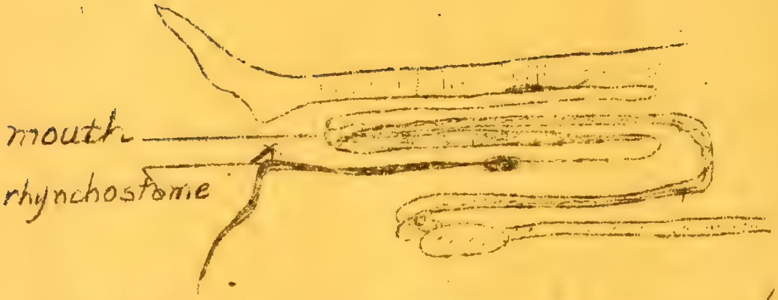

mouth
rhynchostome

fig. 108 side view—proboscis withdrawn

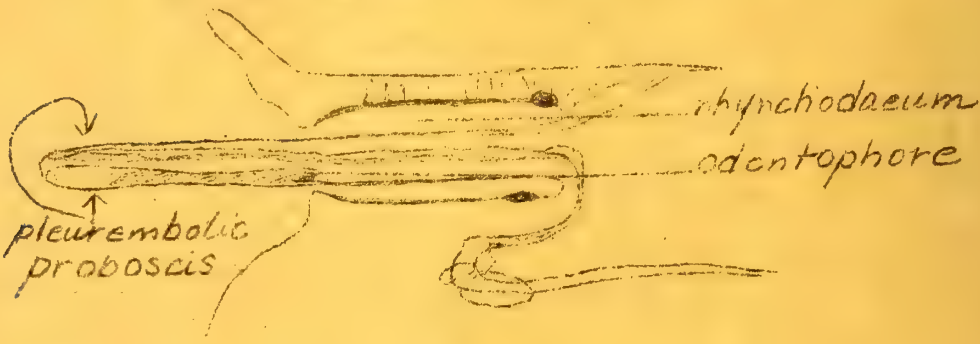

rhynchodaeum
odontophore
pleurembolic proboscis

fig. 107 side view—proboscis extended

EMBRYOLOGY

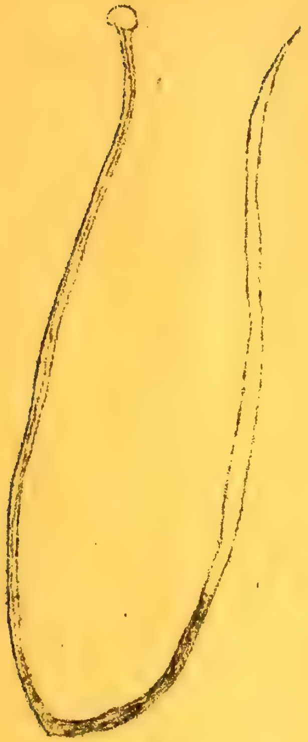


fig. 110 Sperm
hair like

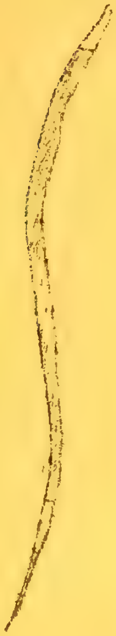


fig. 111 Sperm
worm like

Buccinum — after Dakin

GLOSSARY

A

accessory jaw--vaguely outlined thickenings of a general, horny layer that covers the mouth margins and are continuous with the true median jaw. Lanx alta (Baker, p. 148).

accessory plate (tooth)--see radula

accessory prostate--syn. with divertivulum of gonaduct. See genitalia male. See fig. 33

accessory sperm sac--see fig. 33

aciculae--slender and branching needle-like spines.
ex. Mopalia cirrata

acicular shell--needle-shaped, sharp pointed shell.
ex. Alabina tenuisculpta

admedian tooth--syn. with lateral tooth. Is found in the radula. Lies between the rachidian and marginal teeth. It is less numerous, also usually larger and more variable. See lateral tooth. See figs. 84, 86, 87, 89, 90.

adnate--syn. to adherent. "inner lip oblique, strong, slightly reflected upon and adnate to the base" (Old. 2:2:458).
Odostomia heterocincta (Old. 2:2:458).
Rissoina coronadoensis Bartsch (USNM 42:274, pl. 36, fig. 4,4a).

adrectal gland--found in some Pectinibranchiate gastropods. It is situated at the side of the rectum and secretes a colorless fluid. In Murex and Purpura this fluid turns purple when exposed to the air and in ancient Rome was used as a dye, the Tyrian purple. (P & H, p. 567). See also purple gland and opaline gland. See Clarke, Minutes SCCC, #71, p. 10.

aesthete--sensory organ of chitons found vertically placed in the superficial layer of the shell valves. They may take the form of eyes, with cornea, lens, pigment-layer, iris and retina; in some cases the lens is absent. They may or may not be accompanied by one or more micro-aesthetes. These organs are microscopic and are used by some in determining species. (P & H, p. 543). See also Shipley, Cooke & Reed, p. 188.
ex. bubble-like--Dendrochiton semiliratus Berry (Berry, 1927)
Dendrochiton semiliratus Berry (Ber. Brit. Col., pl 160)
See figs. 42, 43, 44.

alate--syn. winged, diffuse. See those terms too.

albumen gland--lies in the center of the mucous gland of Aplysia. In gastropods which have large eggs, it produces the albumen. It is large in Indoplanorbis (Baker, 1933). See figs. 36, 91.

ambient--syn. encircling. ex. the gills ambient or surrounding the entire animal. ex. Ischnochiton ritteri. See figs. 2, 3.

Amphineura--syn. Loricata. Is a class of Mollusca with bilateral symmetry, posterior and median placed anus, head lacking tentacles and eyes, shell of eight plates bound together with a leathery girdle of connective tissue, separate sexes with eggs fertilized in the mantle. See also chitons.

amphithalamus--having a chamber on both sides.

ancyloid shell--limpet-shaped. "shell white and ancyloid, in youth subdiaphanous" Old. 2:3:745. Ex. Lepeta caecoides Carp. See fig. 60.

angulose-angular--Vitrina angulosa (Wollaston, p. 16)

anterior end--head end of shell. In the Scaphopods, the anterior end is the larger end of the shell. The open little, or dorsal end of the shell corresponds to the apex of gastropods. See figs. 1, 64, 97.

anterior valve--the first, or head valve of the chitons. See figs. 3, 6.

antepenultimate whorl--second from the last whorl. See fig. 56.

anterior termination--small aperture of Dentalium. See fig. 97.

anti-mucronal area--area in front of the mucro of the posterior valve in the chitons. See fig. 3.

antiquated--"marked with the lines or furrows of annual growth" Turton, p. XXI. Term obsolete.

antrorse--turned upward or forward in direction. "apex at about anterior third, acute, antrorse" (Old. 2:3:760). Acmaea paleacea Arnold p. 319

anus--see figs. 4,19,21,24,25,26,27,48,97.

aorta--largest artery, pumping blood from heart to body. See figs. 10,17,18 aperture--the earlier idea was that it was the mouth of the shell. It need not mean that necessarily as many shells (scaphopods, some gastropods) have two apertures or more. Now the term means merely the opening through the body is exposed to the environment. See fig. 1.

alated--Harpa, fig. 57
anterior--Purpura, fig. 58
circular--Cyclostoma
conical--Diadora
diffuse--Harpa, fig. 57
digitated--Harpa, figs. 57,68
dilated--Polynices, fig. 52
emarginated--Voluta
linear--Trivea, Cypraea, fig. 63
long--Strombus, fig. 51
longitudinal oval--Murex, fig. 58
narrow--Conus, fig. 49
oval--Tegula, fig. 50
plicate, fig. 1
posteriorly contracted--Chilina
pyriform--Ficus, Pyrula
reniform--Pila
rounded--Turbo, Epitonium
transverely oval--Stomatia
trigonal--Trochus, Astraea, fig. 65
semi-lunar--Helicina, Neritina
serrated--Nerita, fig. 54
sub-effuse at base--Cionella
sub-quadrate--Cobimacea family, Turitella, fig. 55
wide--Haliotis, fig. 15

apex--It is the nucleus formed by a small quantity of mucous substance secreted by the mantle, deposited on the aperture. When dry, it hardens and is lined by a more calcareous secretion. Each layer is larger. (Sow. Man.) Def. obs. It is now considered to be the tip or summit of the shell, formed by the nuclear whorls or whether they are gone, the tip or summit area being thought of as the apex. See fig. 6.

acute--Kelletia, fig. 64.
blunt--
bulbous--Polynices, fig. 52
concave--Planorbis, Polygrata, fig. 99
decollated--Truncatells, Cylindrells, fig. 101
depressed, fig. 99
discoidal--Polygyratia, fig. 99
excurved--
flat--fig. 99
low--Aulica cymbida Chem.
mammillary--Voluta

apex--continued
- obtuse--Aulica cymbiola (Chem.)
- papillary--
- sharp--
- subcentral--Patella
- subglandiform--Cymba cisium cisium
- subscalar--Pachymelon lutea

apical--pertaining to the apex.
- apical pit--depression at the apex--in Bullidae

appressed--closely adherent

arenaceo-granulate--"shield even and arenaceo-granulate (instead of being uneven and wrinkled, as in the Limaces)". Fine sandy like granulae. Arion ater (Wollaston, p. 69).

areola--
- lacking Cyrena debilis
- has areola in front of the beaks--Cyrena pusilla (see Gould, p. 86).

arterial system--see fig. 17

articulamentum--lower layer of each valve of the chiton. It is projected forward in valves 2 to 8 in two sutural laminae which are separated by a sinus. It is larger than the tegmentum. (Iredale, p. 3). See fig. 6.
- porcelaneous--Ischnochiton californiensis Berry
- subtranslucent, whitish--Basiliochiton lobium Old.
- translucent, hyaline--Ischnochiton gallina Berry

asperated--entire surface being asperated with large and irregular tubercles. ex. Helix berkeleyi (see Wollaston, p. 335).

auricle--chamber of heart which is the recipient of the sinus blood and which opens into the ventricle. See fig. 10, 19.

axial--along the mid-line of the body or appendage

axis--an imaginary center around which the whorls coil.

B

ballast shell--fortuitous introduction, presumably in sand dumped in harbors from the holds of the ships. ex. Margarites pupilla.

barrow ribs--"axial sculpture of pronounced barrow ribs with wider interspaces" (Old. 2:3:171) typographical error in Oldroyd for "pronounced narrow ribs".

basal notch--see siphonal notch
narrow or shallow notch--Aulica translucida (Verco)

basal glands--see genitalia male

base--extreme opposite end to the apex. (Mawe, p. 201)
obtuse and effuse--Mitrella
imperforate--Polynices burnsii
see fig. 1.
base on marginal teeth--lowest part of the tooth

basement membrane--On the radula is a tough, transparent cuticle or sheath covering the anterior of the odontophore like a hood. It is an antero-ventral prolongation of the radular sheath and is continuous with the wall of the buccal cavity. See figs. 45, 110.

beak--syn. with umbone or mucro. It is the posterior projecting extremity along the ridge of the posterior valve at the dorsal area of some genera of chitons. Iredale. See fig. 6.

belt--? term used by Dillwyn, p. 516, 517, 519.
belt double--Voluta pinguis, Voluta gibbosa
belt single--Voluta ringens?

bicanaliculated--two canals formed by the lips thickened and posteriorly contracted near their junction and so drawn out as to form a groove. (Sow. Man.)

bifurcated septum--forked septum
seen in most limpets

bistre-brown--?
Limax agrestis--Wollaston, p. 72

bimarginated--"when right lip forms a double margin" (Mawe, p. 201)

black shield--"somewhat longer than head shield"--Aglaja diomedia Old. 2:1:47. This is a typographical error for back shield.

Bohadsch's organ--the mucous gland of opistobranchiates. See mucous gland.

bosses--coarse, short nodules. Lanx alta (Baker, 1925) has concrescent ventral surface of head covered with coarse bosses. See figs. 64, 65.

branchiae--syn. see gills and ctenidia
in a lappet--Polycera quadrilineata (Muller.) Farron, p. 16
branchial cordon--lacking in Acmaea funiculata--Hanna and Smith, Nautilus, p. 22.
branchial plume--far back on neck-- Hanna and Smith, Naut.,p.22.
see figs. 2, 14, 93, 95, 96

buccal cavity--mouth cavity

buccal orifice--mouth. See fig. 17

buccal crypts of HB Baker are equal to the salivary glands of Bourne. They are patches of mucous epithelium located on the dorsal side of the junction between the pharynx and the oesophageal vestibule and are the middle crypts. (Baker, Hen. p. 283).

buccal ganglia--syn. stomatogastric ganglia. Baker, 1925, p. 159
See fig. 5, 72.

buccal mass-- muscle around the mouth region consisting of the radula and its supporting tissue.

buccal patches--Are regions of epithelium where the elongated goblet cells predominate and ciliated cells are only attenuated columns. They are near the anterior of the radular cartilages. Baker, Hend., p. 283.

buccal veil--Formed from the paired labial expansions at the base of the anterior pair of tentacles of Aplysia.

bulimiform--like Bulimulus (Odostomia atossa) Old. 2:2:184

bulbous nucleus--few whorls, nucleus slightly larger than the next succeeding whorl. It is formed when the larval shell becomes larger, bulbous or subspherical, one-sided and inflated. Dall Wag.

bursa--see genitalia female.

bursa copulatrix--syn. with spermatheca. It is a deeply lobed chamber containing sperm of gastropods.

bursa stalk--spermatheca stalk. It may be a gland which secreted some sort of thick, viscous material as an aid in copulation. Baker, 1925, p. 155.
See fig. 7.

C

caecum--syn. blind pouch. In Haliotis, the caecum acts as a collecting bladder to store the digestive juices as well as mixing them with the food and digestive enzymes. In Aplysia, all the food mixed with this fluid must pass up on one side of the caecum and down the other before leaving the stomach. See fig. 32.

callus--athickening surface material. See figs. 1, 6.

cameo brown--Ischnochiton (Lepidozona) golischi Berry, 1925 Mal. 230)

campanulation--shaped like a bell

canal--edge of notch is expanded and drawn out in form of a beak. (Sow. Man.)
closed--Murex, Ocenebra
decumbent--Tibia
free--some Ranellae
long--Murex haustellum (Sow. Man.)
open--
posterior--fig. 1
recurved--
short--Ranella ranina
straight--
tapering--Ficus
tortuous--
truncated--

canal deferent--syn. sperm duct

caniculated--syn. channeled. See suture.

capituliform complex--in lateral tooth. See Helix (Baker, 64, p. 30)
Lateral teeth in the radula of the Neritidae, often shaped like the blade bone of a shoulder of mutton--Smith EEMS

capsule of verge--syn. hyperphallus--Baker, 1925, p. 157.

captacula--extensible filaments, with sucker-like ends, which arise from the dorsal side of the head in Dentalium and serve partly as sense organs and partly for seizing food. They are provided with fine cilia. See fig. 98.

carinate--when the whorls are strongly keeled as in Astraea.
dorsal ridge carinate--Dendrochiton semiliratus Berry (Ber., 1927)
around whorl base of last whorl--Cerithidea bicarinata. See fig. 1

carrefour--syn. spermoviduct or uterus. Part of the oviduct.

carneous tinge--livid or carneous tinge--fleshy pinky white.
Pupa castanea--Wollaston, p. 454

cartridge buff--dull ivory yellow color.
Ischnochiton gallina Berry, New or little, p. 229

castaneous--bistre brown, Vandyke brown, sepia brown in color.
The well known chestnut brown color.
Tegula impressa Old. 2:3:873 shell with castaneous flammules

caudal canal--"The elongated hollow process which terminates the
aperture anteriorly of some univalve shells".
ex. Murex haustellum--Sow. Man.

central area--the space between the first and last valves of chitons.

central tooth--in radula. See fig. 84, 85

central valves--lie between the anterior and the posterior valves
in chitons. See plates on chitons, figs. 2,3,4,5,

cephalic tentacles--head tentacles. See tentacles.

cerata--lobes or leaf-like processes acting as gills on the back
of nudibranchs. Jaegar. They are the secondary branchiae
of some gastropods (P & H, p. 567). See figs. 93, 94, 95

cerebral commissure--nerve ganglia and cords joined in a circle.
see fig. 10

chiastoneural--certain gastropods in which the visceral cords
cross and form a figure eight. See fig. 107.

chitons--syn. with Loricata and Amphineura. See figs. 2,3,4,5,6,

chromatophores--color pigment cells in the skin layers of molluscs.

chrysodomoid nucleus--see nucleus.

ciliated--cilia are fine hairs.

cinereus--ash-colored.
--epidermis--Urosalpinx cinereus Old. 2:2:325
--with numerous ridges--Trophon orpheus Old. 2:2:335

cingulum--girdle or band of color or a raised spiral line.
The cingulum on the base--Scala stearnsii Dall Wg. 3:245
On the base the cinguli are 6 or 7 in number--Turcicula bairdii
Dall

cingulate--spirally ribbed or ridged

citrine--lemon colored; grennish yellow, mainly yellow.
clouded with citrine, drab along the ridge. Basiliochiton lobium Old. 2:3:905.

clathrate--sculpture of spiral and axial ribs of equal strength, latticed, cancellate.
strongly clathrate shell-- Tritonalia interfossa minor. Old.
depressed, lathrate--Liotia fenestrata Old. 2:3:772

clausium--little door or plate attached to the columella by mean of an elastic pedicle or hinge. When the animal wishes to move out, it pushes back the clausium into a groove where it remains until freed by the re-entrance of the animal. A little spring door. Sow. Pop. Brit. Conch.

clavate--club-shaped. Murex haustellum Linn.

claviform process--club-shaped in internal face of operculum. Old. 2:3:706.

clavus--in nudibranchs, the club-shaped part of the rhinophore.

claws--the lateral tubular or closed linear expansions of the outer lips of some Strombus--Mawe p. 126

clypeiform--shield shaped (inner shell of Aplysia), or like a Patella.

coarctate--contracted--Mawe, p. 201.

coat -of-mail--common name given to shells of genus Chiton since they look like jointed armour (Sow. Man.).

coelom--body cavity lined with cells that are mesodermic in origin.

coil exogastricly--term used by Pelseneer to mean visceral mass falling forward. (Baker, Hend. p. 278).

columella--inner walls of the turns of spiral shell coalesce to form a hollow or solid pillar. Generally such spirals are dextral, though some are sinistral. It forms an imaginary axis around which the shell revolves (P & H, p. 560). It is the lower part of the shell when thoroughly different from the part which wraps the body whorl and is called the columella. (Sow. Man.). See figs. 1, 102. See inner lip.

complicated--folded together in an irregular manner.

compresso-conical--Patella shaped.

concolorous--all the same color

conterminous--many "sub-fossil" forms in which dead ones are found in fossil conditions are found still living, so are conterminous and not "extinct". see also sub-fossil. Wollaston, p. 66.

contiguous--used when whorls rest upon, or touch each other. (Sow. Man.).

contingent whorls--see whorls

convolute--term can be applied only to symmetrical shells, meaning the volution parallel to each other in a horizontal direction (as in Ammonites). The term also is used in Conus in the ones where the whorls are scarcely oblique, the last whorl almost entirely covering the preceding ones. (Sow. Man.).

copulatory pouch of Guiart--see spermatheca.

cord--heavy nerve fibers--see figs. 5, 103
Means also narrow ribs. ex. Cerithidea, Diastoma.
See fig. 56

coriaceous margin--leathery margin

cornea--part of eye. See fig. 29

corneo-calcareous--is mixture of horny and shelly matter in some shells. Also in some opercula which are horny on one side and testaceous on the other. Sow. Man. ex. Aplysia see also operculum.

coronated--crowned; spines encircling the whorls as in Strombus. "shells ornamented with knobs, points, tubercules around the upper edge of the volutions". (Sow. Man.) See fig. 56

corroded--eaten away. The umbones, apices and other thick parts are frequently worn away by the element in which they live. (Sow. Man.) See fig. 101.

coupling in chains--seen in Crepidula and Aplysia. The uppermost animal acts as the male only and the lowermost acts as the female only and the intermediate members varying in number from three to 10 function as males for the preceeding (i.e. lower) and female for the succeeding (i.e. higher) individual. See fig. 48.

crenated margin--margin cut into rounded notches or scallops. ex. Liotia cooleana Old. 2:3:773. See fig. 1 also.

cretaceous texture--chalky

crête stonacle--thickening in central part of stomach of Hendersonia (Baker, Hend. p. 287).

crispate--irregularly twisted or ruffled lamellar apical sculpture. "with 5 strong, anteriorly crispate, amber-brown varices". Murex santarosanus Old. 2:2:310.

crop--lies between the oesophagus and the stomach and is inflated collecting food and saliva, is lined with horny plates which aid in masticating the seaweed. It contains free and epithelial phagocytes which may be absorptive. B & P, p. 567, also Haliotis, LMBC, p. 67. See figs. 7, 10.

crozier shaped--curved like the top of a bishop's staff ex. Spirogyphus lituellus Old. 2:3:652.

crystal sac--see genitalia female--Baker Hend. p. 291

crystalline style--a hard rod formed as a special development of the cuticle of the stomach. It lies in a caecum and is rotated by cilia and moved forward so that its base is constantly replenished and its free end eroded by the gastric shield. Its function is to furnish amylase for the digestion of carbohydrates. (P & H. p. 567, 603).

ctenidial lamellae--vast numbers of outgrowths from the ctenidial rachis. They are in bilateral rows of delicate leaf-like folds attached at their base and to the rachis through which the body blood is carried and dispersed for aeration. (Haliotis, LMBC, p. 46). See ctenidia.

ctenidia--syn. gills, breathing apparatus. It is bipectinate in Haliotis with the sessile larger than the right. The right has a special delicate mantle outgrowth supporting it in Haliotis. See figs. 4, 10, 14, 19, 40, 41, 96, 97, 103, 105.
    ctenidial line--reaching fifth valve in Lepidopleurus farallonis Old. 2:3:852.

cuboid cells--epithelial cells in shapes of cubes.

cuirass--coat of mail. Syn. with loricates, chitons.

cushion--syn. rotella, odontophore.

cusps--tops on the radular teeth.

cyathiform--cup-shaped. See septa of the limpets.

cylindrical--cylinder shaped. ex. Cerion.

D

dart--calcareous stylet in sac found in gastropods near the vaginal orifice. It is used as an adjunct to the sexual act, puncturing prior to the copulation to induce excitement. It is practically confined to the Helicidae. In Helix aspera the dart is about 5/16" in length and is found in adult, mature specimens. Is synonomous with Liebesfeil or telum veneris. See figs. 91, 92.

deck--a lamina of shell which extends part way or entirely across the broad aperture of the limpet-like shells. See figs.60,61.

decollate--apex broken off. The apex or nucleus of some shells being composed of a more fragile substance than the rest, has a tendency to fall off. The reason of this probably is that the animal withdrawing from that part, leaves it unprotected. When the part falls off, the hole is stopped up by a septum filling the cavity of the volution, so as to exclude the air. The shell is then said to be decollated. (Sow. Man.) See fig. 101.

decortication--specimen in which the outer layer has been partially or entirely eroded away. ex. Polynices.

decumbent--prostrate, reclining
canal--running up the sides of the spire--
peripheral keel--Soliaraxis scrobiculatum Conr. Dall Wag.

deltoid--triangular

dentated--toothed

dental formula--referring to radula, by which the teeth are numbered in sequence.

8 : 3 : 1 : 3 : 8 or abbreviated to 1:3:8

uncinal lateral median lateral uncinal (marginal)

where there are no lateral nor uncinal teeth and the median is reduced to a tricuspid series the formula might be as this 0:0:1/3:0:0

denuded--destitute of covering

depressed--flattened vertically (Polygyra). See spire. Spire only slightly elevated above the body whorl. (Smith, 1937).

detached--whorls not resting or touching each other. See non-contiguous whorls.

detorsion--in Opistobranchiata are stages of process of detorsion in which torsion is reversed and the pallial complex is returned to the posterior. The visceral loop is nearly always untwisted in such cases, but the pallial complex reductions are still present. (P & H, p. 560).

dextral spiral shell--"Place the point of a spiral shell towards the eye, with its mouth downwards; if, as in most instances, the aperture be on the right side of the axis, it is a dextral shell, if otherwise, it is sinistral or reversed." (Sow. Man.)

dialyneury--anastomosis of the mantle and visceral nerves. ex. Haliotis.

diaulic aperture--found in Triton where the male and female ducts open separately to the surface.

diaphragm--syn. with septum in Sow. Man.

dichotomous ridges--branching ridges, regularly dividing in pairs.

diffuse--term applied to aperture of univalve when it is spread out or widened into a flat surface, or into digitations. Syn. with alated, dilated.

digestive gland--see liver

digitated--branched out in long points as Ricinula. (Sow. Man.).

dilated--expanded, spread out. See diffuse.

disconnected--tube spearated as in Spirula (Smith ECMS).

discoidal--"spiral shell is said to be discoidal, when the whorls are so horizontally convolute as to form a flattened spire" (Sow. Man.) ex. Planorbis.

discontinuous--also used in cephalopod terminology. The varices of Triton occur in different parts of the whorls, do not form the continuous ridges which characterize the generality of the Ranellae. (Sow. Man.).

divaricating--radiating. See figs. 2,3 .

dorsal--the concave side of Dentalium according to Sars. However, it is the ventral side which is considered the concave side by popular usage. Dall follows this to prevent confusion. (Dall Wag.).

dorsal line--is variation of color pattern or shell area where the unequal lobes of the mantle meet on the back of the shell of Cypreidae. (Smith, ECMS). See fig. 63.

duplicature--"fold tending backwards" Turton XXII

E

eaves--part of valve of chitons which slopes from the center to the margin. See fig. 3
hardly elevated--Chaetopleura gothica
short and inconspicuous--Dendrochiton semiliratus Berry
short and spongy--Tonicia
solid--Ischnochiton regularis
sub-spongy--Ischnochiton trifidus
very spongy--Placiphorella borealis
very strong--Callistochiton palmulatus

ectocone--small, accuminate--Lanx alta (HB Baker, 1925)

effuse--"The aperture of an univalve shell is said to be effuse when there is a notch in the margin which would suffer a liquid to escape, and thus prevent it being filled to the brim." (Sow. Man.)
having the lip separated by a gutter--Mawe
having the aperture extending from one end of the shell to the other, and open at both extremities--Turton
fig. 57

egg sac--a spherical enlargement of the primary oviduct. See fig. 33

elevated--spires are telescoped out in many whorls. Syn. elongated. See figs. 55, 56.

elevators--muscles found at the buccal mass for extending. The retractors also elevate.

emarginated--hollowed out. Outer lip of aperture emarginated--Oliva.

endogastricly--coil of visceral mass falling backwards. It is apparently a term used by Pelseneer. (HB Baker, Hend.).

entocone of lateral teeth--

epidermis--skin outermost covering. See figs. 28, 65.

epiphragm--a membranous septum with which some pulmonates close the aperture during aestivation or hibernation.

epipodial lobes--lateral flaps of the foot of pulmonates.

epipodial tentacles--are tentacles lodged in the larger notches of the epipodium, particularly numerous in the ventral fringe. They are concerned in orienting and cleaning the shell, may also assist in finding food and suitable lodging.

epipodium--is a ridge or fold which may run around the entire gastropodial foot. It is a collarette originating dorsally from the foot and extending laterally from the cephalic tentacles to the dorsal foot groove.The epipodium has numerous tentacles, notches, and sensory structures lying both in the dorsal and ventral fringes. Between the fringes is a knobbed and gullied area also with tentacles. It may be developed as wings or fins in the Pteropoda. See fig. 15.

epididymis--see genitalia male. It is located in the gastropod at the sperm duct and tapers to form the short, slender part of the sperm duct.

euthyneury--secondary symmetry of the gastropod nervous system due to untwisting of the visceral loop caused by detorsion (Opisthobranchia); by a shortening of the connectives (Pulmonata) ex. Navanax and Tethys (Opis.) Helix aspera (Pul.).

evanescent--vanishing.
incrassated corneus rim sometimes evanescent in the center, Bulimus badiosus (Wollaston, p. 429).

eversion--"means the out-rolling of an organ so that it is turned inside out during extrusion. An organ may be protruded as the result of the eversion of the penis-sac to which it is attached (i.e., the stimulator of Derocerasagreste (L.))." Webb, 1947, p. 136

excretory organs--kidneys which are dorsally placed glandular tubes or chambers communicating with the pericardium. One or two may be present in gastropods. See kidney.

excurvate--curved outward, convex. base excurvate--Littorina castanea Old. 2:3:63.
excurved apex--Crepidula convexa glauca Say. fig. 60.

eyes--one of the sense organs of gastropods. In nearly all gastropods, the eyes are cephalic, though in Oncidium, a littoral Pulmonate, are numerous eyes over the dorsal surface. The eye contains a cornea, lens, retina and is surrounded by a less dense vitreous body. Parker and Haswell, p. 555. The aesthetes are also considered sight organs.
See figs. 15,23,40,41,42,43,44,47

F

fasciated--banded or striped. Ex. Carocolla marginata

fasciole--1. That part of whorl posterior to the carina or periphery and forward as far as the breadth of the anal sinus. Dall Wag. 2. That band or twist near the termination of the pillar in gastropods that have a notched anterior (siphonal) canal. Reed. see fig. 1

fasciculated--ornamented with pointed markings near the suture. Smith. ex. Oliva. The little tufts or bristles at the valve ends of the chitons. (Sow. Man.).

fertilization chamber--see genitalia female

filiform--thread-like. ex. Margarites albolineatus, filiform ..lines.

fimbriated--fringed. ex. Murex fimbriatus

fimbriae bifid--"teeth" of chiton--Dall Wag., meaning the fringes.

fin--foot specialized for swimming. See fig. 80.

fissure or perforation--posterior opening of Dentalium--(Sow.Man.)

flagellum--a slender, long, tapering diverticulum forming sperm into an elongated mass. It is located where the sperm duct enters the penis in gasteropods. P&H p. 572.

fold--see plait.

foot--is the ventral surface of the gastropod body modified for locomotion or for secreting mucous. In Janthina the foot secretes mucous which is capable of making an airfloat. The secretion is increased in the breeding season to make a larger float in which the eggs are suspended. See fig. 20. The quantity of blood present in the spaces of the foot determine its turgity. The foot contains three parts; 1. middle part--mesopodium; 2. anterior--propodium (is large in the burrowing forms); 3. posterior--metapodium (may carry the operculum. It may have pedal appendages Pteropodal fins). See figs. 2,11,12,17,21,23,35,97.

foramen--hole. See keyhole-limpet. See fig. 59

fornix--arch or fold. The fornix is circularly arched over a short sulcus.--Old. 2:3:842.

foveolate--having small pits or depressions.

free--whorls are not contiguous; see whorls

front--the surface on which the aperture opens.

fugacious--lasting but a short time.
epidermis very thin, fugacious--Siphonalia nodosa Mart.--Arn.

fuliginous--sooty, dark-colored. See int. of Lora alaskensis.

fulvo-corneous--yellowish

fundus--(of stomach) region of large swollen area. See fig. 9

funicular--consisting of a small thread or cord. See umbilicus.

funiculate--forming a narrow ridge.
The funiculum, a tongue shaped form. See Polynices reclusiana for the funiculum process from the columella.

fusiform--spindle shaped, swelling at the center and tapering to the extremities. ex. Fusus, Tralia, Fasciolaria.

G

ganglion--a collection of nerve cells.

Gastropod--Unsymmetrical mollusk, with mantle, single unsymmetrical shell usually with spirally coiled valve enclosing a visceral mass of corresponding form. Typically with two plume ctenidia usually in the mantle cavity, though they may have gills or just breathe through the mantle wall. The head bearing eyes and tentacles is present in most, the foot is behind the head and is flattened ventrally generally. The buccal cavity has a radula bearing an odontophore. The kidney is single generally. The nervous system has distinct pleural, and cerebral, buccal, pedal, parietal and visceral ganglia. The sexes are sometimes separate, sometimes united. Larvae pass through the trochophore and veliger stages. (Parker and Haswell) Some are marine, some freshwater and some land dwellers. See figs. 59,60,64,65,67,93,94,95,103.

gastric shield--a thickening of the wall of the stomach for triturating.

genital aperture--see fig. 4.

genital mass--includes the sexual organs and is associated with the visceral mass, frequently intermingled with it.

Approx. Homologies	Neritidae (Bourne)	Theodoxus (Gilson)	Helicinidae (Bourne)	Hendersonia
Gonad	Ovary	Ovary	Ovary	Ovary
Rt. renopericard. canal	oviducocoelomic funnel	absent	absent	absent
Primary gonaduct	oviduct (above oviducocoelomic funnel)	oviduct	oviduct with first limb V	primary oviduct, egg sac, narrow and enlarged portions
Common renopericardial-gonadic duct	end of oviduct and thalamus; egg duct	fertilization chamber & première ampoule (Lenss.)	2nd limb V, receptaculum seminalis	fertilization chamber and accessory sperm sac
	vaginal canal	Connecting duct	vaginal canal	connecting duct
Rt. kidney	receptaculum seminalis	spermatheca	caecum	spermatheca
	sperm sac	bursa	vaginal sac	provaginal sac
Rt. ureter	vagina	vagina	vagina	provagina
Rt. nephrostome	vaginal aperture	intromittent orifice	vaginal aperture	provaginal orifice
Secondary gonaduct	öötype	glandular and incubatory oviduct	öötype	uterus (Lenssen)
	crystal sac	uterus		

Female Genitalia chart from H B Baker – Hendersonia –

MALE GENITALIA

Approx. Homologies	Neritidae (Bourne)	Theodoxus (Lenssen)	Helicinidae (Bourne)	Hendersonia
Gonad	testis	testicule	testis	testis
Primary gonaduct & rt. reno-pericardial gonadic duct	epididymis and spermduct	canal deférent	sperm duct	epididymis and spermduct; opening of provaginal sac
Rt. kidney	absent	absent	absent	provaginal sac
Rt. nephrostome	absent	absent	absent	closed papilla
Secondary gonaduct	thalamus & prostate terminal chamber	poche semi-lunaire	terminal sac	first prostate second prostate, terminal chamber and papilla
	basal glands	glande annexe	First & second diverticula	accessory prostate and caecum

From HB Baker - Hendersonia

gibbose or gibbus--"bunched out, embossed, having a lump or swelling of any kind". (Sow.Man.). Hump-backed--Smith. ex. Bulinus lyonetianus

gill--see ctenidia. See fig. 2

girdle--of chitons "flexible integument, composed of muscular tissues in which the insertion plates or edges of the valves are embedded". Its surface may have scales, spines, spicules. The girdle may in some species encroach on the valves. Iredale. The girdle surface will have the following in some combination: scales, spicules, hairy processes all of which may be smooth, rounded, polished, flat, irregular, regular, striated, curved, straight, uniform, irregular.

gizzard--stomach in gastropods lined with chitonous or shelly plates. See figs. 7, 32.

glandiform plug--operculum shaped like a nut or ball. Fartulum orcutti

glande annexe--see genitalia male

glande contournée of Guiart--convoluted part of the mucous gland.

glaucus--sea-green color or dull green passing to grayish blue. Crepidula convexa Say.

globose--spherical. ex. Helix.

glomerate--collected into a spherical form or mass. Shell of corkscrew growth, glomerate--Pelatoconchus. Vermiculum annellum on Haliotis.

gonad--see ovary. See figs. 11,12,33,34,41,97.

gonaduct--tube to carry eggs from ovary to exterior of body. See figs.4,8,33,34.

gouttière oesophageal--shallow groove in the stomach of gastropods HB Baker, Hend. p. 287

gouttière pylorique--intestinal compartment in stomach HB Baker, Hend. p. 287

granulated--covered with minute grains, rough. See lip of Oniscia.

growth lines--See fig. 1, see also Ill. Glos. part I, p. 2.

gustatory organs--in the buccal cavity of chitons gutter--narrow interspace.

haemocoele--coelom for blood

haliotoid--ear shaped. See Haliotis, fig. 15.

head--see fig. 2, 35.

head disc--tactile organ with sessile eyes and tentacles when present. Morphologically formed by buccal tentacles and the upper tentacles or rhinophores of scaphopods. See fig. 98.

head plates--syn. with first valve of chitons. See fig. 6

heart--of gastropods has a smaller, thin walled auricle, a larger, thick walled ventricle. The auricle collects blood from the sinuses. The ventricle leads to the aortae. P & H, p. 552. See fig. 40.

helcion shaped shell--limpet shaped. See figs. 60,61,62.

hemispherical--syn. globose.

hepatic ducts--open into the liver. See fig. 9.

hepatic pancreatic gland--many lobules combine to form a lobed gland opening through compartments into the stomach. The epithelium of the hepatic-pancreatic globules contain both liver and chalk cells. HB Baker, p. 288. See fig. 11.

hermaphroditic duct--leads from the hermaphrotic gland. See fig.36, 91.

hermaphroditic gland--found in some pulmonates in which some of the follicular cells produce eggs and some produce sperm. Parker and Haswell, p. 571. See also fig. 91.

Heteropoda--Taenioglossic gastropods pelagic and with a single auricle. Swim ventral side uppermost, using foot as a fin. It has a sucker. Is predaceous. See fig. 40,41.

hibernaculum--syn. epiphragm. (Sow.Man.).

hibernating or torpid season--epiphragm formed for during this season of aestivation.

hispid--syn. pubescent, pilose. See Helix portosanctan Woll. p. 92.

hoary--see pubescence

holostomate--aperture circular, without a canal. See Halistylus.

hood--produced margin of the dorsal plate--Cavolina occidentalis.

horny--see nucleus

hydrophanous bands--disappear upon being dry.
See Bulimus from the Philippines (Gould, p. 208)

hyperphallus--capsul of verge. (H B Baker, 1925)

hypobranchial gland--in the female pulmonate surrounding the provaginal orifice in Hendersonia. (HB Baker, Hend. p.278) It is the mantle mucous gland producing two types of mucous cells; 1. the large (to 80 micra) mucous cells secreting the spindle muceiin through the opening; 2. the small (10 to 15 micra) cells which have an erratic eruption through the cell wall. See figs. 8, 33,34. See also mucous.

I

imbricated operculum--nucleus at the edge, development one-sided. (Smith, ECMS), see operculum.

immersed--apex concealed by subsequent whorls, appearing sunken within them.

imperforate--shell lacking umbilicus--Bucknill. Calliostoma

incrassated--thickened. See Astraea, fig. 65 on operculum.

incubatory oviduct--see sac.

incurved--turned inwards or bent forwards. Term is applied to symmetry. (Sow. Man.) See Patella. Syn. inflected.

inflated--ventricose

inflected--see incurved.

infundibuliform--funnel shaped.

inner lip--sometimes called the columellar lip or labium. Many types are decumbent, detached, straight, thickened, tortuous, tumid, varicose.

inoperculate--lacking an operculum.

insertion plates--are at the sides of the valves of chitons and serve to attach to the girdle. They are generally cut into by slits. See fig. 6.

intermediate vlaves--the valves between the head and anal valve in chitons.

internal cast--"The mould of a fossil shell, composed of matter which entered the shell in a soft state, and has subsequently hardened, when, the shell dropping off, the hardened substance which filled it is left to represent the internal form". (Sow. Man.). It is also called a conchyliomorphite.

internal shell--"one which is buried in the soft parts of the animal, as a bone is enclosed in the flesh of a human body". (Sow. Man.) It is usually horny with separate layers of calcium underneath, and generally held in place by upgrowing mantle folds. ex. Lirax, Tethys, Aplysia. See figs.47,69.

intestine--see figs. 8,10,17,33,34.

intromittent orifice--part of female genitalia.

introvert--elongated cylinder bearing the mouth at the anterior end. It is extended when feeding; at other times, the introvert is completely involuted within the head and anterior part of the body. P & H. p. 548. See fig. 108.

involute--rolled inward from each side as in Cypraea. See spire.

irregular--non-symmetrical univalves. ex. Serpulids. Those which attach to or imbed in other marine bodies, no constant form, but the shape is determined by the contour of the place where they were attached. See fig. 67.

J

jaws--syn. mandibles. They are two flexible horny plates one on either side of the buccal cavity in gastropods. They contain rows of tiny denticles. They have no masticatory function in Aplysia, for example, but stiffen the buccal orifice and form a working base for the radula. See fig. 10,17,30,31.

jugal sinus--the depression between the sutural laminae, sometimes called the sutural sinus (Reed).

jugal tract--the surface of the tegmentum in chitons adjacent to the jugum (Reed).

jugum--the longitudinal ridge of a chiton valve (Reed).
jugum arched or gothic--Ischnochiton trifidus

juncture or junction--"The circular line, where one volution or turn of a spire meets another"--(Turton).

K

keel--syn. carina. It is a projection ridge along the middle of a flat or curved surface, especially at the periphery of the whorl in gastropods. Keeled ribs--Harpa. See figs. 1, 65.

kidney--sac with thick, glandular and highly vascular walls, the inner surface of which is completely golded. It communicates with the mantle cavity and by passage to the pericardium. (Parker and Haswell), p. 552. See figs. 4,12,40,97.

L

labiate--referring to the labium or inner lip, or to the labrum or outer lip.

labium--see inner lip.

labrum--is the exterior side of the aperture in univalves. It is measured from where it joins the body whorl above to where it joins the inner lip below. (Sow. Brit. Pop. Conch.)
alated --expanded
dentated--with large teeth
denticulated--studded with small teeth
digitated--drawn into lobes
inflected--turned inwards
reflexed--turned outwards
unthickened

laciniate--fringed or jagged. Laciniate margin--Acmaea stella.

lacunate--with a small gap, pit or depression.
columella lacunate--Phasianella compta punctulata Old.

laminae of insertion--plates of insertion

lamellated--scale-like. See operculum.

lanceolate--lengthened like a lance. See fig. 92.

lappet--syn. flap, extra piece. Lappet with branchiae in it, Polycera quadrilineata (Farron, p. 16).

lateral area--"that portion of the tegmentum of an intermediate valve in chitons often triangular in shape, lying at the sides and toward the anterior, usually sculptured diagonally and set off from the central area by a diagonal ridge". (Reed). See fig. 3.

lateral radular tooth--see admedian tooth.

lateral streak--in Patella and other gastropods is frequently a distinct glandular outgrowth of tissue in the young forms of nerve cells. A rudimentary flap covers this, the whole structure may be connected with prevention of desiccation. It disappears in the adult forms. See fig. 12.

length--the length is the line passing from the dorsal part of the whorl on the opposite side of the shell. (Sow. Man.).

lens of eye-- focus~~s~~ing part of the eye. See fig. 29, 42.

lenticular--biconvex, lens like. Planorbis campanulata Say.

ligulate--thin; slender, strap-shaped, tongue-shaped.

lime cells--cells for secreting the shelly part of the shell.

lioplaciform--shaped like Lioplax. ex. Aquilonaria turneri Dall.

lip or edge of aperture--see inner lip or outer lip of univalve.

lippar--as used by Oldroyd is a typographical error for pillar

lira--"a fine ridge between two small furrows". Bucknill.

lirulae--little lirae. incremental lirulae in the interspaces. Ocinebra foveolata Arn.

liver--digestive gland formed of glandular follicles; usually associated with the gonad. See fis. 13,18,19,80,97.

lobate or lobed--divided into parts.

loricate shells--comes from the latin. Syn. with chiton which derives from the greek.

luminal--surface open to the lumen.

lung--see ctenidia, also see mantle and pallial cavity. Lanx alta has a vestigial lung.

lunulate--syn. semi-lunar.

M

maculated--spotted. ex. Ischnochiton golischi Berry.

malleations--hammered appearance. weakly malleated, Odostomia quadrae.

mammillary--nipple shaped.

mandible--syn. jaws.

mantle cavity--see figs. 26, 267.

mantle collar--see fig. 35

mantle-flap--in gastropods is a fold of the mantle covering the mantle cavity. See figs. 11, 12, 13, 71.

marginal teeth--see radula. See figs. 84,85,86,87,89,90

marginated--edge or border is thicker than the rest of shell. (Sow. Man.). Marginella is a good example.

margaritaceous--pearly in texture

margaritiferous--pearl forming.

mazarin blue--deep blue. ex. Calliostoma costatum caeruleum Old.

median tooth--see radula. Syn. central tooth.

melo-nucleus--enormous nucleus. It is exaggerater trochiform type, dome like. See nucleus. Dall Wag.

mentum--a thin fold at the anterior end of the foot. It is separated from the foot proper by a deep groove. (HB Baker Hend., p. 275) mentum elongated--Turbonilla

mesocone--one of cusps on tooth

mesopodium--middle part of foot. It is large and important in gastropods. It may bear suckers (Atlanta). See fig. 13.

metapodium--posterior part of the gastropod foot. It may bear the operculum. See fig. 13, 66.

micropyle--thin, delicate spot on the ovum through which the sperm enter into the ovum. Not found in all ova, but are in Patella. (Patella, LMBC).

mikado brown--seen in Ischnochiton golischi Berry.

monaulic aperture--undivided aperture for products of the female and male ducts and copulation. See in Aplysia.

mouth--aperture or opening of univalve shells. It may often have a protrusible proboscis, the introvert. It is the anterior end of the digestive system. See figs. 2,4,7,19,21,23,97

muciparous or mucous glands--syn. pedal gland. They are narrow accessory oviducal glands in gastropods, fused or separate producing mucous for protection and for surrounding and clearing away debris from the anus and renal organs and to keep the ctenidia clean, and to aid in locomotion. The mucous is of two types (see hypobrandhial gland) and is in the form of spindles, packed tightly together when it emerges from the cell opening. Upon discharge the spindles swell up, become amorphous and finally disappear. This type is discharged to protect the epipodium. The other type of mucous cells discharge through eruption through the cell wall. The mucous of Haliotis solidifies upon exposure to sea water, and hence is not dispersed. See Haliotis LMBC.
See figs. 7,14,36,45,46,91.

mucous float--is mucous froth holding the eggs together. See fig.20.

mucro--any small sharp point. It is a projection on the posterior valve of chitons dividing it into two areas. See fig. 3.

mucronate apex--sharp pointed Bittium orthochila.

multilocular--many chambered, term usually applied to cephalopods, but also applicable to whorled gastropods.

multispiral--spire is many whorled or to an operculum of numerous volutions. (Sow. Man.).

multivalves--composed of many valves or pieces as in chitons.

muricated--sharp points or prickles.
"ribs muricated by fine incremental lines"- Puncturella cucullata

muscular pad or pillars--bunches of muscles.

N

nephridium--syn. nephridial gland. more advanced type of kidney. Nephridial gland is thought to be a lymph organ; an organ for reserve matter; concerned with the formation of blood. Is closely allied with the vascular system, the function is not definately known (Dakin, LMBC).

nephrostome--kidney (primitive). See genitalia female and male.

nepionic whorls--the second stage of the embryonic shell (Reed).

nervous system--is composed of distinct pleural, cerebral, buccal, pedal, parietal and visceral ganglia. Nerve cords connect these ganglia. In the gastropods, the symmetry may be primary or secondary, depending on the group. See also euthyneury and torsion. See figs. 70,71,72,97,103,104,105, 106.

nidamental gland--syn. mucous gland.

nodulose--bumpy

non-continuous--space between whorls. See detached, free.

non-symmetrical univalves--rolled obliquely on the axis. Most gastropods are non-symmetrical.

notch--anterior canal sinus. See fig. 1.

nuchal cavity--cavity formed above the head and below the shell by the muscular wall of the neck region. It is a local deepening of the pallial cavity originally formed for a branchial cavity to shelter the ctenidia which since have been lost. The nuchal roof is well supplied with blood spaces and trabeculae, thus showing its respiratory function. Into this neck region open all apertures of the body except the mouth in Patella. (Patella, LMBC). See fig. 11

nucleus--apex or the first part of the shell formed by the embryonic animal. It is seen on the posterior aspect of the spire and the larvae. It consists of the protoconch and larval whorls and the beginnings of the adult whorls. There are two main types, horny and shelly. The horny nucleus is formed when the larva is in the ovicapsule. While there, the horny matter begins as a slender cone or elevated part along the axis of the protoconch. As the larva grows, the posterior part of the mantle secretes a shelly dome. (Dall Wag.) The nucleus is not seen on all univalves, it is frequently eroded and is so small usually that a hand lens is needed to study its surface. The main types used in classification are:

1. Bulbous--Voluta repestris Gmelin
2. Trochiform
    large, sculptured--trochoid or planorboid
        Voluta musica, Voluta virescens
    large not sculptured-- Voluta undulata
    small, planorboid, smooth
    pupiform
3. Melo--enormous nucleus
    broadly shouldered--Aulica vespertilio vespertilio
    blunt--Aulica tissotiana

heterostrophic--reversed--Pyramidellidae

nucleus--continued Melo--continued
irregularly coiled--Adelomelon ornata
lateral--Purpura
planorbid--Amoria undulata undulata
reversed--Odostomia, some Calliostoma
stiliferous--Amoria canaliculata
tilted-- Aulica sophia
sinusigera--Pleurotomella
very large, obtuse, shining--Cymbium.
4.Scaphelloid-- type--Scaphella junionia
Caricella type--Scaphella ancilla
Cymba type--Symba species
Tonna type--smooth or nearly so
Triton type--elevated and spirally ciliated.
See fig. 1.

O

obconic--inverted conical--Family Conidae

obovate--inverted ovate--Cymbium

obtuse--blunt, most frequently used to express shape of spire. see spire of Megaspira (Sow. Man.).

ocelli--nerve cells specialized to distinguish light and dark. Present in the tegmentum as aesthetes in chitons and in the epipodium of some gastropods.

ochreous--dirty yellow

octangonale-eight angled, eight sided. See Dentalium.

odontoblasts--cells in the radula sac of gastropods which form the teeth of the radula.

odontophore--syn. cushion or rotella. It is a cartilaginous support for the radula and radular sac. It is complete with protractor and retractor muscles. The odontophore and the radula can be extruded through the mouth. It forms most of the buccal mass. See figs. 9,10,11,17,30,70.

oesophageal crypts--are the posterior crypts of mucous cells on ventral side of the junction between the oesophageal vestibule and the bases of its lateral sacs.

oesophageal pouches--are largeon all Rhipidoglossa, especially so in Haliotis. They extend to the level of the anus in Haliotis and end blindly. They are lined with minute papillae. See fig. 9.

oesophageal vestibule--is continuous with the pharynx giving off posteriorly an enlarged oesophageal sac which terminates by the oesophagus proper. HB Baker, Hend., p. 283. See fig. 9.

oesophagus--canal connecting the stomach to the mouth. Fig. 9,10,17.

olfactory organ--in Gastropods is a sense organ present in the shape of group of cells in the tentacles, in which the oflactory nerve fibers end.

ootype--see genitalia female.

opaline gland-- gland of Vayssière, or gland of Bohadsch (Mazzarelli) or poison gland (Cunningham), is a grape shapped gland (so called by Cuvier) lying under the floor of the anterior part of the pallial cavity in Aplysia. It is near the purple gland. See fig. 7. Its rarely discharged fluid is milky and acrid, some species having a nauseating odor. (Eales, LMBC). See fig. 19

operculate--operculum present.

operculum--a shelly or horny door, cover or lid formed from the nucleus and obliquely regularly deposited with laminated additions. It is attached to the posterior of the foot of gastropods on the upper surface, and when the animal returns into the shell, this portion enters last and thus seals the shell (Sow.Man.). In dextral shells, the operculum when ppiral is sinistral. In sinistral shells, the spiral is dextral. There are a few exceptions to this in Pilidae and Spiratellidae. The number of turns in the operculum are made by the revolutions of shell, and slo wly formed by the shape of the aperture. Sometimes it is principally calcareous such as in Neritina, Nerita. Some are corneo-calcareous, on an internal laminae of horn is a thickened layer of shelly matter (Turbo and Phasianella) incrassated. All corneous are Polynices, Trochus, Trophon. See fig. 65, 68, 73.
Opercular types are based on the direction in which the successive layers are deposited.

1. Nucleus central--
spirally constructed
radiating whorls numerous--multispiral
Trochus, Skeneopsis alaskana
radiating worls few--paucispiral
Cyclostoma, Littorina (fig. 76)
flattened spiral--unispiral
scarcely one whorl--subspiral--
Syneera translucens
concentric--fig. 77 Aulopoma

2. nucleus lateral--lammellated

operculum continued

3. Nucleus at one side, not spiral lammellated
4. Nucleus forming a terminal claw--unguiculated--Strombus
5. Progess which radiates from nucleus--radiating

See figs. 13, 14, 16, 18, 25, 40, 64, 65, 78, 79

opercular valves--those which form the operculum--Sow. Man.

opisthobranchiate--gastropods resembling or being of the group Opisthobranchia, or Euthyneura. They are marine gastropods with aquatic respiration, having detorsion, ctenidia often replaced with secondary branchiae, reduced shell and with united sexes. See Aplysia, Tethys, Pteropoda,

optic nerve--see fig. 29,72.

oral--"applied to that part of a shell which corresponds with the mouth of the animal, but very seldom used in this sense." (Sow. Man.).

orbicular--round or circular.

organ of Bohadsch--syn. withopaline gland

organ of Spengel--see osphradium

organe de la glare--syn. with nidemental gland.

orthoneury--straight nervous system.

osphradium--syn. organ of Spengel. It is the sense organ of suppoded
olfactory function. It is located near the base of the
ctenidium and used to test the conditions of the water that
enter the mantle cavity. It is closely applied to the
ma mantle cavity and presents a central axis connected at right
angles to two rows of delicate nerved lamellae.
See fig. 10,71,72.

otoliths--syn. statocyst. They are the stones for balance found in the otocyst nerve some distance away from the main cavity of the otocyst.

otocyst--is a cavity lined by ciliated epithelium, the cells being in contact with nerve fibers. It forms the organ of orientation and are epidermal in origin, located in the anterior face of the pedal ganglia. See fig. 23

outer lip of aperture--sometimes called the right lip or labrum. Types of outer lips are, alate (Strombus), acute, crenated (Purpura, fig. 58), digitated (Aporrhais), inflected (Cypraeidae, fig. 63), obtuse, reflected, toothed

oval--Cypraea

ovate--egg-shaped or pointed oval--Achatina.

ovary--organ in female to produce eggs. Frequently it is combined to be both ovary and testis (ovotestis). See fig. 4, 13, 17, 19, 40, 80.

oviduct--consists of the carrefour, the prebulbar oviduct, the bulbous oviduct, post-bulbar part with two possible diverticulae, the albumen gland and the nidamental gland. (Baker, 1925, p. 153) See fig. 10, 33, 91

oviducoelomic funnel--see right renopericardial canal

oviparous mollusc--produces its young in eggs.

ovotestis--hermaphroditic reproductive gland found in certain molluscs. See ovary. See fig. 17, 33, 36.

P

pallial cavity--lung or mantle cavity formed by the infolding of the mantle and contains ctenidium, osphradium, anal, excretory and reproductive apertures.

pallial cleft tentacles--are tactile and olfactory, preserve the shell orientation, keep shell perforations clear for escape of deoxygenated water with genital and excretory products. In Haliotis are never more than three, and pass through the shell holes. They are formed from the edge of the mantle. See fig. 8.

pallial complex--the mantle cavity and associated parts of mantle, ctenidium, osphradium, mucous glands, siphon, and the rectum and anal opening, renal opening and the male and female genital openings.

pallial mucous gland--a glandular area on the inner surface of the mantle of gastropods.

pallial siphon--highly developed in Murex, Buccinum, Nassa.

pallium--syn. with mantle.

papillary--tiny nodes or bumps.

papillae--in male genitalia

papillated sac of Hellar--see renal organ

papillose--bearing papillae or minute nipple-like projections

papyraceous--thin, light in texture, like paper.

parabranchium is the primitive right osphradium found in many of the branchiate Prosobranchia. Parker and Haswell, p. 571

parapodia--lateral prolongation of the foot also called epipodia. These lateral lobes of the foot act as fins in some gastropods. See figs. 19, 48.

parietal callus--enamel on the inside wall of aperture--Smith

parietal valves--principal valves of multivalve shells (Sow. Man.).

parietal wall--"in side wall of shell within aperture" (Smith, ECMS)

patellate--saucer shaped. See figs. 59,60,61,62.
ex. ucapina, Patella, Megathura, Acmaea

patelliform--shaped like a saucer.

patulous--openly expanded or dilated as in Thais, gaping.
Patulous opening--Rissoina newcombei Old.
outer lip--Perplicaria puplexa Dall Wag.

paucispiral--few spiraled. See operculum.

pedal--refers to foot.

pedal ganglion--see fig. 40.

pedal (mucous) gland--syn. mucous gland. It is a simple or branched invagination of the integument secreting a lubricating mucous for general protection and for healing injuries. The mucein is much more viscid than that of the hypobranchial gland. See also hypobranchialgland. See figs. 14, 15.

pedal groove--is a deep incision running transversely across the anterior margin of the foot. It is a slit-like common opening for a large number of glands which secrete the egg capsule substance. (Buccinum, LMBC).

penial complex--In Indoplanorbis it is the male copulatory organ consisting of preputium, vergic sac, vas deferens and several sets of retractor muscles. (Baker, 1933)

penial retractor muscles--heavy in Indoplanorbis exustus.

penis--is the entire male copulatory organ as so used by Baker in 1925. He considers the glans or penis of authors as the hyperphallus or capsule of verge. See figs. 19, 48, 91

penultimate--previous to the last, the last but one. See fig. 55.

perforated--a small round opening and having the appearance of being bored (Haliotis). Sometimes the term is applied to an umbilicus which penetrates a shell through the axis to the apex, as in Eulima splendidula. (Sow.Man.)

pericardial membrane--thin, transparent membrane lining the pericardium. This is American usage. It is the pericardium according to British usage. See fig. 11, 12

periostracum--Gray used the term for substances which most comchologists call epidermis. "Drap marin" of the French naturalists. It is the outermost of the three layers comprising the molluscan shell.

periphery--that portion of each whorl which is most outwardly developed and usually midway between suture and base. The heel or that portion of a whorl which extends outward the greatest distance.

peristome--"cord-like thickened edge of the lip in univalves". (Smith ECMS).

peritreme--"A term used to express the whole circumference of the aperture of a spiral shell. In descriptions, it is said to be notched or entire, simple, reflected, round or oval, etc. as the case may be". (Sow. Man.).
entire--Cyclostoma peritreme

perlaceous--pearly

pervious axis--narrowly umbilicate. ex. Irenosyrinx pacifica.

pharynx--is the small, ovoid buccal cavity, extending in some instances under the odontophoral apparatus.

phasis--syn. to type or kind of animal. (Wollaston, p. 92).

phytophagous habit--vegetable feeder. ex. Haliotis, Acmaea.

picescent tinge--?

pilaster--syn. with pillar, in a muscular or cord like sense.

pillar--syn. pilaster. Is the usual English name for the column which forms the axis of spiral shells, around which the whorls revolve". (Sow. Man.), same as columella.
pillar twisted--Trochus terebellus, truncate--Nerita.

pilose--very fine, short epidermal hairs closely placed together.

pinselzellen of Flemming--sensory fibrils of stiff, slender nerve processes on the mantle cavity and on the inner sensory surfaces of both pairs of tentacles (of Aplysia).

pinnated--"protruberant part when radiated or ribbed, like the fin of a fish, it is pinnated, as in Murex pinnatus and Murex tripterus". (Sow. Man.).

pisiform--shaped like a pea or small globular body. (Sow.Man.).

plaited--folded, see columellar plaits or folds. See fig. 1.

planorboid-in nucleus, is similar to trochoid, but the cone becomes flat above. (Dall Wag.).

planate--flattened

pleural nerves--refers to nerves leading chiefly to the mantle and ctenidia. See fig. 5, 17

pleurekbolic proboscis--term used by Lankester to describe a type of proboscis in which the base is pulled in last. It is found in the Cypraeidae. (Buccinum, LMBC)

pleurembolic process--term used by Lankester to describe a base of a proboscis which pulls in first and disappears. It is found in Buccinum (Buccinum LMBC).

plicate--"rib-like internal teeth or folds present" (Smith, ECMS).

plug--shelly structure closing the apical opening of some gastropods (shelly operculum).

plumbeous color--bueish color (blue-purple).

pneumostome--see aperture of mantle cavity.

pôche semilunaire--see male genitalia Baker, Hend., p. 294.

poison gland--see opaline gland. ex. Turridae, Conidae.

polygonal--many sided

posterior--"The posterior extremity of the aperture of a spiral univalve shell, is that nearest to the spire. In patelliform shells the anterior and posterior extremities are distinguishdd by the muscular impression, which is annular, enclosing a central disc in the inner surface of the shell, excepting where it is interrupted by the place where the head of the animal lies, which of course is anterior". (Sow. Man.)
In Dentalium, the posterior end is the small end. See fig. 97.

posterior valve--last of the eight valves in the chitons. Fig. 3,6.

post-mucronal area--area behind the mucro of the posterior valve of chitons. It may be absent in some genera. See fig. 3.

preputium--syn. with penis sheath. It is the thin cylindrical sac. See figs. 35,36,37,38,39.

primaries--primary ribs. ex. Drillia schismatica.

primary gonaduct--includes oviduct, and egg sac of Hend. in the female. The primary gonaduct and right renopericardial goniduct are the equivalent of the epididymis and sperm duct or canal deferent. See male genitalia. (Baker, Hend.) See fig. 8.

proboscis--"Fleshy part containing the mouth of the animal".(Smith ECMS). See introvert. See fig. 41.

procumbent--see varices.

produced--"A term applied to the spire of univalve shells, or to any other prominent portion" (Sow. Man.). See spire.

profound--deep. See sinus.

propodium--ant. part of the gastropod foot. It may be enlarged and well developed in burrowing forms. See figs. 13, 66.

prostate--elongately ovate organ composed of many diverticulae which are mostly paired. See male genitalia. See figs. 34,36.

protractive axial ribs--ribs that slant from the preceding suture forward. ex. Rissoina cleo Bartsch

protractors--muscles which protract or extend the radula.

protandric--a protandric hemaphrodite, is first a male, then bisexual for a time and finally becoming a female. ex. Crepidula fornicata.

protoconch--initial whorl of the larval gastropod shell, smooth and cup shaped.

provaginal apparatus--copulatory organ modified from the right kidney in Hendersonia.

provaginal orifice--see genitalia female. It may be for the reception of the male product in some cases (Hendersonia occulta). See figs. 8, 33.

provaginal sac--see genitalia female. It is the thin walled sac imbedded between the fertilization chamber and the exterior of the mantle. It it part of the right kidney. (Baker, Hend., p. 291). See figs. 33,34.

pseudobranch--bilobed in Indoplanorbis. See fig. 35.

pteropod--pelagic gastropod. See figs. 80, 81,82,83.

pubescende--coating of fine wool-like substance;down.

pubescent--see hispid, pilose.

pulmonary sac--syn. lung. It is found mainly in the pulmonata. The mantle cavity has a roof rich with blood vessels and is completely enclosed except for a small opening. Trachaea or branching air tubes may be also present.

punctured--"when spots, in the color pattern, are so small as to resemble points or dots". (Smith, ECMS).

pupiform--like pupae or larval insects. ex. Turbonilla periscelida. pupiform nucleus contains more whorls than the trochoid, the whorls increasing but little in diameter transverse to the axis. (Dall Wag.).

purple gland-- lies on the under side of the free edge of the mantle. In the resting animals, it is yellowish or brownish. It secretes a rich reddish purple dye when the animal is irritated which mixes with the sea water and forms a cover screen for the animal. See Clarke, and Aplysia of LMBC.

pustules--tiny pimples, blisters, wart-like projections.

pylorus--part of stomach. See fig. 9

pyriform--pear shaped, round and large at one end, gradually tapering at the other. (Sow.Man.).

pyramidal--ex. Terebra maculata

Q

quincunx--pattern of five spots in a square, one at each corner, one in the center.

tubercules are arranged so as to present an irregular quincunx. ex. Turcica caffea Old.
graduated in quincunx, see fig. 3

R

rachidian tooth of radula--synl with median or central

radula--found in gastropods, mainy in the order Prosobranchiata. They are found in Amphineura, Scaphopoda, Cephalopoda. The radula is a bilaterally symmetrical lingual ribbon secreted from cutin from the base of the epithelium of the base part of the sheath. It is coiled like a watch spring and is used to scratch, tear or bore. A small amount is used at a time. Food is passed over it and is carded small. It is used to drill shells to extract out the animal. It is often red or yellow in front. The radulas in the young may be different from the adults. They aren't present in all types of gastropods. While bilaterally symmetrical, any series may be absent, the median often being absent in certain species. There are three types; median or rachidian teeth; lateral or admedian teeth, with major and minor laterals; marginal or or uncinal teeth. See figs. 17,30,31,84,86,87,88,89,90,85. The lateral teeth are formed from the sheath epithelium, but the inner parts are formed from a dorsal typhosole of epithelium. Due to constant usage the teeth tube breaks open to form a ribbon. As the teeth are broken off, more are formed from the base of the caecum.

radular caecum--contains radula exposed on the floor of the buccal cavity. Its bifurcated blind end goes back to the narrow part of the oesophagus. It is partly enclosed in the cephalic aorta. See fig. 17.

radular cartilage--part of radular complex.

radular pouch--purse or caecum.

radular sac--part of radular complex. See figs. 9, 10.

radualr sheath--secretes the chitin to enlarge the teeth and forms the basement membrane of the radula.

ramified--branched out. Syn. with ramose.

receptaculum seminalis--see spermatheca. It is the terminal end of the hermaphroditic duct as a pouch. It is used to store the sperm and where fertilization is said to occur. The receptaculum seminalis of Bourne is the accessory sperm sac of Baker. See genitalia female.

rectum--posterior part of the intestine terminating in the anus. See figs. 11, 12.

recurved--"turned backwards; the term, when applied to symmetrical conical univalves is used to signify that the apex is turned towards the posterior margin, as in Emarginula". (Sow. Man.)

reflected--turned backwards, as opposed to inflected (Cypraea). ex. Bulinus on the outer lip.

renal aperture--see fig. 4.

renal organ--the right renal organ is typically depuratory, excretory of uric acid, forcible expulsion of fluid for removal of surplus liquid. Also it acts as a repository for genital products.
The left renal organ (syn. papillated sac of Haller) is much smaller than the right and has probably acquired new functions such as special phagocytic activity. It has strong ciliary movement of the fluid contents. (See Haliotis, LMBC).

reniform--kidney shaped. ex. aperture of Ampullaria

reno-pericardial gonadic duct--see chart of genitalia female. It includes the end of the oviduct, thalamus, vaginal canal, fertilization chamber and accessory sperm sac of authors. The right renopericardial canal includes oviducoelomic funnel (see Baker, Hendersonia).

repand lip--seen in some Neritidae

repent--"A term applied to those shells, which, being attached by the whole length of their shell, give the idea of creeping or crawling." (Sow.Man.) The Vermetes group.

reproductive system--see figs. 91, 92.

respiratory system--see figs. 93,94,95,96.

reticulated--network

retina--nerve ends in the rear of the eye which distinguish light and dark. They are composed of pigmented and sensory cells, of origin ectodermal. They are found in the aesthetes of the chitons. See figs. 29, 42.

retinophorae--specialized cells with basal nuclei in the retina of gastropods having light refracting ranules, sometimes also have black pigment granules and ganglionic cells connected by nerve fibers.

retinulae--specialized cells in the retina of gastropods with dense brownish black granules packed into heaps distally in the cells. Also have ganglion cells in connections. (see Haliotis, LMBC).

retractive axial sculpture--ribs that slant from the suture back.

retrally--toward the back or posteriorly. "periostome incomplete retrally and furnished with a tooth on the pillar". (Sow. Man). ex. Odostomia.

retuse--ending on an obtuse summit.

reversed--"applied to a spiral shell whose volutions turn in a contrary direction to the generality of shells; that is, whose volutions turn from the left hand to the right ..." (Syn. sinistral). (Turton).

reversed nucleus--less of systematic value than formerly supposed. May be masked.

rhinophores--are the prolongated anterior angles of the head shield. ex. Navanax, Tethys, Aplysia. See figs. 19, 47.

rhynchodaeum--cavity in which the proboscis and the sheath are. See figs. 108, 109.

rhybchostome--syn. with false mouth. It is the area of the cavity surrounding the proboscis and sheath. This cavity is thus around the true mouth on the end of the proboscis. See ffg. 108, 109.

ribbed--see fig. 2.

rimate--provided with a very small hole or crack; narrow umbilicus. ex. Littorina castanea

rostrum--platform or shelf. See fig. 69

rotella--cushion or odontophore

rudimentary--imperfectly developed

rufescent--red color. ex. Pyrulofusus harpa

S

sacculate--sac or bag-like (see lumen of kidney)

sac of the dart--is an eversible sac containing a calcareous stylet found in gastropods (Parker and Haswell, p. 572).

salient--jutting out, prominent

salivary duct or glands--see fig. 10, 17

sarcobelum--stimulating organ (Baker, 1933).

scalar--resembling a ladder (Reed). ex. Cancellaria sericea Dall.

scales--muscular tissue in girdle of chitons. Varies according to species. See fig. 3.

Scaphopoda--class of mollusca which is bilaterally symmetrical. Has a tubular shell open at both ends, a small foot used for burrowing, a head with many prehensile processes called captacula, a radula, separate cerebral and pleural ganglia; no ctenidia and with only a rudimentary circulatory system; trochosphere larvae. See figs. 97, 98.

scutiform--shield-like

scutum--a shield

secondaries--secondary ribs. Drillia schismatica Dall (Dall Wag.).

secondary gonaduct--in male includes the thalamus, prostate, terminal chamber, basal glands, accessory prostate and caecum.

secondary oviduct--syn the uterus of authors (Baker, Rend., p. 292). It reaches from the base of the fertilization chamber to the ovipository opening.

selenizone--central zone of periphery. See fig. 1 (A paleontological term).

securiform--hatchet shaped. (Sow. Man.).

seminal receptacles--where sperm is stored. See fig. 91.

seminal vesicles or resevoirs--accessory genital glandular organ where the alkaline secreted is formed.

sense organs--include the eyes, statocysts, osphradia, olfactory organs, taste buds, tentacles.

septum--syn. deck. It is the small internal process or diaphragm to which muscles attach to the shell in Gastropoda. See figs. 60,61.
Different types of septa are dup-shaped, bifurcated, siphonal, subungulate, triangular, transverse.

sessile--low, dwarfed, attached

setae--hairs--sutural setae are characteristic of Dendrochitons.

setiferous--hairy

sex organs--the penis, spermatheca and duct, free oviduct, vagina and atrium of gastropods.

shouldered ribs--ribs with nodes at the periphery of the whorl.

side organs (of Thiele)--sense buds--are slightly extensible, ciliated, cream colored areas under the ventral epipodial fringe. They are probably sensitive to chemical change. (See Haliotis).

simple--single~~s~~, entire, uninterrupted, undivided (Sow. Man.).

sinistral--reversed shell. The aperture of the shell is on the left when held with the mouth downwards and towards the observer. (Sow. Man.). See Balea, Clausilia.

sinuous--winding, serpentine.

sinus--a depression, or bay. See fig. 1.
In the valve of chitons, separating two sutural laminae See fig. 6.
In the circulatory system--a thin walled area in the blood vessels which collect blood from organs.

sinusigera nucleus--see nucleus.

siphon--in gastropods is a spout-like or tubular prolongation formed by the mantle border through which water is conducted to and from the gill cavity. See figs. 10, 13, 14, 16, 35.

slit-rays--pass to the apex of each valve inside to from the slits in the insertion plates of chitons.

sorghum brown--dull, dark brown.

Spengel's olfactory organ--syn. with osphradium

spermatheca--syn. with receptaculum seminis, Swammerdam's vesicle, copulatory pouch of Guiart. See figs. 7, 19, 36.

spermatozoa or sperm--is the male genital product which combines with the female product or egg to form the molluscan embryo. See figs. 110, 111. In the same species may be sperm of two distinct types., 1. the hair-like--long with distinct head, 2. worm-like--wider and shorter than the hair-like form.

spermoviduct--see figs. 36, 91.

spicules--little spines. See fig. 3.

spines--thin, pointed spikes.

spinose--has spines or elevated points

spiral--"Revolving outwards from a central apex or nucleus, like the spring of a watch. A shell or an operculum, may be spiral, without being produced into a pyramid. Bands of colour, striae, grooves, etc. commencing from the nucleus and following the volutions of the shell, are described by the above word". (Sow. Man.).
irregularly spiral--Vermiculum

spire--that portion of a univalve shell exclusive of the last whorl. Frequently of different structure from the rest of the shell. Is often horny, easily broken off (Tritons). In Bulinus decollatus, the apex to the depth of several whorls falls off, and the shell is then decollated. (Sow. Man.). "The cone or pyramid produced in a non-symmetrical univalve by its oblique revolution downwards from the apex or nucleus. The spire, in descriptions, includes all the volutions above the aperture". (Sow. Man.). See figs. 64, 99, 100, 101, 102.
concealed--Scaphander, Volvulella cooperi
conical
deciduous
depressed
elevated
elongated
excavated
hidden
involute--Haminea hydatis
produced--Cymbium aethiopica broderipii
sub-mucronate--Natica affinis
sub-scalar--Provocator provocator
tapering
ventricose

squamose--scaly, covered with scales.

statocysts--syn. otocysts. They are the special sense organs of orientation originating in ectoderm and developing as part of the nervous system. In Haliotis they retain their primitive attachment to the anterior side of the pleuro-pedal ganglion, with the static nerve going to the cerebral ganglion. Separation between the statocyst and the ganglionic mass is made in growing specimens by infiltrating connective tissue. In pelagic gastropods the statocysts migrate into the vicinity of the cerebral ganglion nerve centers. In Haliotis the statocyst is protected by the anterior position of the pedal muscles. The statocysts are hollow vesicles with ciliated and non-ciliated cells which move the statoliths formed by glandular cells. See LMBC, Haliotis. See fig. 70.

statoliths--calcareous stones of equilibrium in the statocysts. See fig. 70.

Stiftchen--hair-like processes present in the cell structure of visual organs of gastropods. See Buccinum, LMBC Memoirs.

stomach--is smaller than the crop in Haliotis. It lies between the crop and the intestine, tho the line of demarcation from the intestine isn't great. The stomach has a spiral caecum containing glands of digestion. The function of the stomach is to collect the mixed food and salivary secretions, to add acids from the stomach caecum and from the digestive glands. See figs. 11, 13, 19, 32, 97.

sub--used as a prefix and signifying nearly. (Sow. Man.)

sub-mucronate--see spire

subungulate--see septum

sub-pallial sense organs of Thiele--strips of sensory cells from the osphridia around anteriorly the bases of the right and left shell muscles. Thiele considered them links between the outer pallial lobes and the respiratory cavity. See sense organs.

subulate--awl shaped, long and pointed, tapering. See fig. 99.

sulcate--furrowed with wide grooves or channels. ex. Trivia.

sulcus--longitudinal forrow.

summit--portion of the whorl just below (anterior to) the suture. shouldered at the summit--Turbonella pentalopha D & B.

sutural commissure--see commissure.

SUTURAL LAMINAE--IN CHITONS, A THIN SHEET EXTENDING FROM ONE VALVE BELOW THE ADJOINING ONE (JOHNSON AND SNOOK). SIDE OF INTERMEDIATE AND TAIL VALVES OF CHITONS WHICH ARE OVERLAPPED BY THE PREDEDING VALVE WHEN IN NORMAL POSITION—REED. LAMINAE ARE PARTS OF THE CHITON VALVE SEPARATED BY A BAY CALLED THE SINUS. THEY HELP TO LOCK TOGETHER THE COMPLETED SHELL (IREDALE). SEE FIG. 6.

SUTURAL PLATES--LARGE AND WIDE--LEPIDOCHITONAAALBA (OLD.).

SUTURE—THE LINE OF JUNCTION OR SEAM BETWEEN THE WHORLS OF GASTROPODS. "A SEAM, STITCH, JOINING TOGETHER. APPLIED PARTICULARLY TO THE LINE WHICH MARKS THE JOINING OF THE WHORLS OF THE SPIRE. THE SUTURE IS DISTINGUISHED AS SIMPLE, AS IN MOST CASES; OR DOUBLE, WHEN ACCOMPANIED BY A PARALLEL GROOVE CLOSE TO IT, MARGINATED, WHEN PRODUCED INTO A LEDGE BY THE MATTER WHICH FILLS UP AND COVERS IT; OBSOLETE, WHEN IT IS FILLED UP SO AS NOT TO BE VISIBLE AS IN THE CASE OF ANCILLARIA". (SOW. MAN.).
APPRESSED--DRILLIA HOPLAPHORUS DALL (DALL WAG.)
CHANNELLED OR CANICULATED--BUSYCON CANALICULATA. SEE FIG. 1
DISTINCT**
DOUBLE -- SYN. WITH CHANNELLED
ENAMMELLED--COVERED WITH CALLUS
GROOVED
IMPRESSED
MARGINATED— BORDERED BY A RIB
OBSOLBTE
SIMPLE
TUMID

SWAMMERDAM'S VESICLE—SYN. SPERMATHECA

SYMMETRICAL**BOTH SIDES ALIKE. SOME ROLLED HORIZONTALLY ON THE AXIS.
SYMMETRICAL CONVOLUTE--SPIRULA, PATELLA
SEE FIGS. 103,104,105, 106, 107

T

TAIL PLATES--SYN. POSTERIOR VALVE OF CHITONS. SEE FIG.1

TECTIFORM KEEL--SYN. WITH PRODUCED KEEL. SEE HELIX BULWERII WOLLASTON, P. 188

TEETH**"ANGULAR PLAITS, AS ON THE PILLAR LIP OF VOLUTES" (MAWE, P. 206). RHACHIDIAN (UNPAIRED)HELIX, SHORT ELEVATED SHELLY RIDGES ON THE OUTER LIP (DALL WAG. P. 59). TEETH OF CHITONS ARE INSERTION PLATES, THE EDGES OF WHICH ARE COMBED OR PECTINATED: SQUARE, OR PROPPED (WITH THICKENED PERIPHERIES) (IREDALE, P. 3). ON THE RADULAS ARE THE LITTLE HORNY RASPING ORGANS. SEE RADULA.

TEGMENTUM**THE UPPER EXPOSED LAYER OF EACH VALVE OF THE CHITONS. IT IS SMALLER THAN THE ARTICULAMENTUM. (IREDALE, P. 3). CORDIFORM**AMICULA PALLASII (OLD. 2:3:876) 323). SMOOTH, SHINING, LIVID—ISCHNOCHITON LIVIDUS OLD. 2:3:876.)
CRENULATED—LEPTOCHITON HEATHI BERRY. SEE FIG. 6.

TENTACLES--EXTENSIBLE HOLLOW TUBES ON THE HEAD OF SNAILS. THEY ARE SENSITIVE TO CHEMICAL CHANGES IN THE WATER AND TEMPERATURE. TWO PAIRS, THE FIRST PAIR BEING SHORTER AND ARE SUPPOSED TO BE OLFACTORY, THE SECOND PAIR BEING LARGER AND BEARING A SIMPLE EYE SENSITIVE TO DARK AND LIGHT.ON THE STALK END IS THIS EYE. THE INSIDE TIP CONTAINS A MUSCLE ATTACHED WHICH CONTRACTS THUS TURNING THE TENTACLE OUTSIDE IN. (BORR. AND POTTS, P. 555). OTHER TENTACLES, (TYEES OF CERATA) ARE FOUND COVERING THE DORSAL SIDE OF NUDIBRANCHS AND ARE USED FOR BREATHING. SEE THE PALLIAL CLEFT TENTACLES OF HALIOTIS. SEE FIGS. 10, 14, 15, 17, 23,35, 47.

TEREBRATING SHELLS-- "SHELLS WHICH RESIDE IN HOLES PIERCED ROCKS, WOOD, ETC. BY MEANS OF SOME CORROSIVE SECRETION OF THE ANIMAL". (SOW.MAN.).

TERMINAL--ULTIMATE, FINAL. THE NUCLEUS OF AN OPERCULUM IS TERMINAL, WHEN IT FORMS AN EXTREME POINT, OR IS CLOSE TO ONE OF THE EDGES. (SOW. MAN., P. 291).

TERMINAL CHAMBER--SEE MALE GENITALIA BAKER, HEND. 294. SEE FIG. 34.

TERMINAL SAC--SEE MALE GENITALIA BAKER, HEND. 294.

TESTACEOUS--"HELLY TESTACEOUS MOLLUSCA, ARE SOFT ANIMALS HAVING SHELLS. A TESTACEOUS OPERCULUM IS ONE COMPOSED OF SHELLY MATTER". (SOW. MAN.) NATICA CLAUSA.

TESTIS--IRREGULAR OVAL MASS OF LOBULES IMBEDDED IN THE BASE OF THE VISCERAL MALL CONTAINING SPERMATOZOA IN VARIOUS STAGES OF DEVELOPMENT. THE TESTIS LOBULES CONVERGE TO FORM THE PRIMARY SPERMADUCT WHICH IS SO COILED AS TO RESEMBLE AN EPIDIDYMIS. (BAKER, HEND., P. 293). SEE OVI-TESTIS.

THALAMUS--SEE MALE GENITALIA (BAKER, HEND., P. 294).

THROAT--PRODUCED COLUMELLA OR BODY WHORL. LACKING LIRAE--DRILLIA ABUNDANS VAR. PERRUGATA DALL
THROAT AND BASE VIOLET--CONUS
THROAT ORANGE--VOLUTA CRUENTA . THROAT WHITE--VOLUTA VESPERTILLO

TORPID SEASON--HIBERNATING

TORSION--TWISTS IN BODY OF GASTROPODS. IT IS MOST MARKED IN THE MAJORITY OF PROSOBRANCHIA. IT IS PROBABLY ACHIEVED BY THE ARREST OF GROWTH ON ONE SIDE AND ACTIVE GROWTH ON THE OTHER. IT RESULTS IN ASYMMETRICAL, FREQUENTLY COILED ANIMALS. THE PALLIAL COMPLEX SHIFTS FROM THE POSTERIOR POSITION GENERALLY ON THE RIGHT SIDE FORWARD. THE RESULT IS IF THE HEAD IS IN SYMMETRY AND THE PARTS BETWEEN THE HEAD AND THE ANUS ROTATE OR UNDERGO TORSION THROUGH ABOUT 180 DEGREES AROUND A VERTICAL AXIS ANTI-CLOCK WISE, THUS MAKING THE ANIMAL SMALLER AND MORE COMPACT. IN MANY STREPTONEURA THE PALLIAL COMPLEX PARTLY OR COMPLETELY PASSES ACROSS THE MIDDLE LINE AND THE ANUS COMES TO REST TO THE LEFT OF THE MOUTH. THE RESULT IN TORSION IS THE ENTERIC CANAL IS LOOPED AND THE PLEUROPARIETAL CONNECTIVES ARE THEN TWISTED INTO A FIGURE 8, THE RIGHT CONNECTIVE BECOMING SUPRA-INTESTINAL AND THE LEFT INFRA-INTESTINAL. ACCOMPANYING TORSION IS THE USUAL SUPPRESSION OF PAIRED PARTS, ONE OF TWO KIDNEYS IS FUNCTIONAL, PRIMITIVE RIGHT (TOPOGRAPHICALLY LEFT) CTENIDIUM IS LEFT. (PARKER AND HASWELL, 560) SEE FIGS. 24, 25, 26, 27.

TORTUOUS--TWISTED. TORTUOUS COLUMELLA--JANTHINA

TRABECULAE**SMALL TUBES, USUALLY THIN WALLED CARRYING FLUID OR AIR.

TRACHEAE**BRANCHING AIR TUBES FOUND IN THE PULMONARY CHAMBER OF ONE FAMILY OF PULMONATA.

TRANSVERSE**"THE TERM APPLIED BY SOME AUTHORS TO EXPRESS THE DIRECTION OF THE LINE OF GROWTH IN BIVALVE SHELLS, AND THE SPIRAL LINES IN SPIRAL SHELLS (SOW. MAN. P. 295).

TRENCHANT**POINTED, MARKED. OUTER LIP TRENCHANT**BULLA.

TRIAULIC APERTURE**FOUND IN DORIS WHEN THE MALE, FEMALE AND COPULATORY PORTIONS OF THE HERMAPHRODITE DUCT ARE DISTINCT. APLYSIA LMBC, VOL. 24, P. 61.

TRILOBATE--DIVIDED INTO THREE LOBES OR PRINCIPAL PARTS. SYN. WITH TRIPARTITE.

TROCHIFORM**SHAPED LIKE A TROCHOSPHERE OR LARVAE.

TROCHOSHORE**DEVELOPMENT OF FREE SWIMMING EGG STAGE, TYPICAL OF GASTROPODA. A SPRERE WITH AN APICAL TUFT OF CILIA AND A GIRDLE OF CILIA. SEE FIG. 23.

TUBULAR**HOLLOW CHANNEL. SEE DENTALIUM.

TUMID**SWOLLEN**TUMID VARIX**OLIVA.

TURBINATE**TOP SHAPED**SEE TURBO, ASTRAEA.

TURGID**SYN. TO VENTRICOSE, PUFFED UP, SWOLLEN, INFLATED.

TURRETED**ELONGATE, TOWER SHAPED, WITH UPPER WHORLS ANGULATED OR SHOULDERED AS IN TURRITELLA.

TYPHOSOLE**CAECAL VALVE. IN APLYSIA IS THE GLANDULAR FOLD IN THE STOMACH CAECUM TO MIX MORE THROUGHLY THE CONTENTS. SEE FIG. #". IN THE INTESTINE THE TYPHOSOLE EXTENDS ALMOST TO THE ANUS OF HALIOTIS FOR ADDITIONAL SURFACE ABSORPTION.

U

UMBILICAL CHINK**A FISSURE SEE LACUNA.

UMBILICATED*//HAVING A HOLE AT THE BASE OF THE PILLAR (MAWE).

UMBILICUS**"THE HOLLOW FORMED IN SPIRAL SHELLS WHEN THE INNER SIDE OF THE VOLUTIONS DO NOT JOIN EACH OTHER SO THAT THE AXIS IS HOLLOW. THE TERM IS ALSO USED TO EXPRESS ANY SMALL, NEAT, ROUNDED HOLLOW". (SOW. MAN.). " CAVITY, CIRCULAR DEPRESSION OR CHINK AT THE BASE OF SPIRAL UNIVALVES, AFFORDING LIGHTNESS AND STRENGTH: NOT PRESENT IN ALL. THOSE POSSESSING IT ARE TERMED PERFORATE; THOSE WITHOUT, IMPERFORATE." (BUCHNILL, P. 123).
BIFID UMBILICUS**NERITA CANRENA, NERITA CANCELLATA, NERITA SPADICEA.
FUNICULAR**CANCELLARIA SERICEA, LIOTIA COOKEANA
INFUNDIBULIFORM**MARGARITES SUCCINCTA CARP., PHORCUS (TROCHUS) PULLIGO
KEELED**MARGARITES INFLATULA DALL
LARGE**TURBO DELPHINUS, TURBO EXASPERATUS
LARGE AND PERVIOUS**TURBO DISTORTUS
WITH SPIRAL CALLOSITY**NATICA
TOOTHED**NERITA FULMINEA
SEE FIG. 1

UMBONE**SEE BEAK.

UNCINA**SYN. WITH MARGINAL TEETH. ARE NEAR THE MARGIN OF THE RADULA, SAMLL, SIMPLE AND SIMILAR.

UNDULATED**MINUTELY WAVED.

UNGUICULATED**"OPERCULUM IS ONE IN WHICH THE LAYERS ARE DISPOSED LATERALLY AND THE NUCLEUS CONSTITUTES PART OF THE OUTER EDGE". (SOW. MAN.). SEE OPERCULUM, THRPHON. IS CLAW SHAPED.

UNI*AURICULATED**HAVING ONE AURICLE

UNISPIRAL**SEE OPERCULUM

UNIVALVE**"A SHELL CONSISTING OF A SINGLE PIECE, AS DISTINGUISHED FROM BIVALVES AND MULTIVALVES, WHICH ARE COMPOSED OF TWO OR MORE PRINCIPAL PIECES. SPIRAL SHELLS HAVING AN OPERCULUM, ARE CALLED SUB*BIVALVES BY SOME AUTHORS." SOW. MAN. SUB*BIVALVES ARE NOW OBSOLETE NOMENCLATURE.

URETER**PART OF EXCRETORY SYSTEM. SEE FIG. 8. SEE GENITALIA FEMALE.

UTERUS**PART OF FEMALE REPRODUCTIVE SYSTEM. SEE FIGS. 8, 33, 36.

V

VAGINA—SEE FIG. 36.

VAGINAL APERTURE, VAGINAL CANAL, PARTS OF THE FEMALE REPRODUCTIVE SYSTEM.

VARICES—A SWELLINGS CAUSED BY PERIODIC RESTS OR STOPPAGES IN SHELL GROWTH. THE EDGE OF THE LIP THICKENS SUCCESSIVELY AND FORMS THE WHORL. THE REST PERIODS ARE REGULAR, THE WHORLS ARE CONTINUOUS, WHEN THEY ARE IRREGULAR, THE WHORLS ARE DISCONTINUOUS. (SOW. MAN.). THE TERM HAS BEEN APPLIED TO ANY SWELLING RIDGE, SUCH AS THAT ON THE LOWER PART OF THE COLUMELLA OF ANCILLARIA. SEE ILL. (SOW. MAN.). THE VARIX IS FORMED ON THE OUTER SURFACE OF SPIRAL SHELL, BY THE THICKENED, REFLECTED EDGE OF A FORMER APERTURE, AFTER FRESH DEPOSITS OF TESTACEOUS MATTER HAVE INCREASED THE SIZE BY ADDING AND THE GROWTH OF THE SHELL BEYOND IT. IN THIS MANNER THERE ARE FREQUENTLY MANY VARICES, OR EDGES OF FORMER APERTURES, IN VARIOUS PARTS OF THE SPIRE AND THE BODY WHORL. (SOW. MAN.)
CONTINUOUS**RANELLA
DISCONTINUOUS**TRITON**SEE FIG. L.
GUTTERED**TROPHON CALLICERATUS DALL
LACINIATED**TROPHON CLATHRATUS
PROCUMBENT**TROPHON PEREGRINUS
RAMIFIED OR RAMOSE**MUREX
SIMPLE**SCALARIA
SPINOSE**MUREX SPINOSUS

VARIX**SINGULAR OF VARICES

VARICOID**SWOLLEN LIKE**DRILLIA NEWMANI DALL

VARICOSE**SEE VARICES

VAS DEFERENS**TUBE CARRYING THE SPERMATOZOA; LEADS TO THE BLADDER AND BEGINS AT THE POSTERIOR OF THE VERGE TO WHICH IT IS EQUAL IN DIAMETER. IT IS FREELY MOVABLE IN THE VERGIC SAC. THE DISTAL END OF THE VERGIC SAC TAPERS DISTALLY TO FORM THE FREE PORTION OF THE VAS DEFERENS. (BAKER, 1933). SEE FIGS. 36, 37, 38.

VALVE LAYERS—VALVE LAYERS OF CHITONS ARE THE INNER OR ARTICULAMENTUM AND THE OUTER OR TEGMENTUM. IREDALE.

VEIL**MARGINAL BORDER PASSING OVER HEAD TO GILL AREA OF SOME NUDIBRANCHS. (SOW. BRIT. POP. CONCH.)

VELUM**A CILIATED RING FORMED BY THE PROTOCHNCH AND IS SYNONOMOUS WITH THE PRE-ORAL CIRCLET. WHEN FULLY DEVELOPED IT IS THE VELIGER STAGE AS A BILOBED CILIATED FLAP AND SERVES AS AN EFFICIENT ORGAN OF LOCOMOTION FOR THE GASTROPOD LARVA. (PARKER AND HASWELL), P. 577). SEE FIG. 23, 24, 25, 26, 35.

VELIGER—SEE VELUM. IT IS PECULIAR TO THE MOLLUSCA AND HAS A SHELL AND A FOOT. IT IS THE FREE SWIMMING LARVAL FORM REACHED WHEN THE VELUM IS FULLY DEVELOPED. SEE THE ILL.

VENA CAVA**SINUS DRAINING THE BLOOD FROM THE VEINS INTO THE HEART.

VENERIFORM** LIKE VENUS, A PELECYPOD. VENERIFORM FOOT. CADULIDAE

VENTRAL**SIDE WHERE THE MOUTH OPENS (THEORETICALLY), BUT USUALLY THE SIDE NEAREST THE SUBSTRATE, AS OPPOSED TO THE DORSAL SIDE OR THE TOP SIDE AWAY FROM THE GROUND. VENTRAL SIPHON*"IN SYMMETRICAL CONVOLUTE UNIVALVES, IS THE ONE PLACED NEAR THE INNER EDGE OF THE WHORLS" (SOWL MAN.). "THE VENTRAL SURFACE OF A UNIVALVE SPIRAL SHELL IS THAT WHICH FACES THE OBSERVER WHEN THE APERTURE IS PLACED TOWARDS HIM. THE VENTRAL PART OF THE WHORLS OF SYMMETRICAL CONVOLUTE SHELLS, IS THE INNER PART, THAT WHICH IS N EAREST TO THE SPIRE." SOW. MAN. IN DENTALIUM IS THE ARCHED SIDE ACCORDING TO SARS AND DALL FOLLOWS HIS POPULAR USAGE TO PREVENT CONFUSION, THO., ACCORDING TO HIM IT IS THE DORSAL SIDE. DALL WAG.

VENTRICLE**THE PART OF THE HEART THAT PUMPS THE BLOOD THROUGH THE CIRCULATORY SYSTEM. IT IS THE ENLARGED PART AND THICK WALLED. SEE FIG. LO, L9.

VENTRICOSE**INFLATED OR ROUNDED

VENOUS**REFERRING TO BLOOD RETURNING TO THE HEART IN VEINS. VENOUS SINUS**FIG. L7. VEINS, FIG. 18

VERGE—TRUE VERGE EXTENDS FROM THE MALE OPENING AND TRANSERS THE SPERM. IT IS 8 CYLINDRICAL ORGAN ALMOST TWICE AS LONG AS THE PREPUTIUM. IT CONTAINS A SPERM CANAL OPENING IN AN APERTURE IN THE CENTER OF THE FREE PORTION. IT IS FREE AND MOVABLE AND TERMINATES PROXIMALLY IN A BULBOUS SWELLING SITUATED ABOUT ONE*THIRD THE DISTANCE BETWEEN THE PREPUTIUM AND THE FREE PORTION OF THE VAS DEFERENS. THE BULBOUS PORTION OF THE VERGE COMPLETELY FILLS THE DIAMETER OF THE VERGIC SAC. IT IS SITUATED JUST BEHIND THE RIGHT TENTACLE, IN THE VOLUTES. SEE FIGS. 36, 37, 38.

VERGIC SAC**CONTAINS THE BULBOUS VERGE AND TAPERS DISTALLY TO FORM THE FREE PORTION OF THE VAS DEFERENS. (BAKER, 1933).

VERMICULAR**WORM SHAPED, SERPENTINE.

VERNICOSE**SURFACE COVERED WITH AN EXTREMELY THIN, DENSE, VERNICOSE, PALE APPLE*GREEN EPIDERMIS. EX. TURCICULA BAIRDII DALL.

VERTEX**SYN. APEX.   VERTEX MAMMILLATE**DIALA ACUTA, LITTORINA CASTANEA.
VERTEX PLANATE**CALYPTRAEA CONTORTA.

VIBRACULA**? "EYES LATERAL NEAR THE BASE OF THE VIBRACULA" GOULD, P. 139. MARGINELLA SEMINULA.

VINACEOUS**FAWN COLOR (REDDISH). BASILIOCHITON LOBIUM, ISCHNOCHITON GOLISCHI BERRY

VITREOUS**PORCELANOUS**ODOSTOMIA RESINA, ODOSTOMIA COLUMBIANA. VITREOUS BODY OF EYE, SEE FIG. 5*.

VISCERAL HUMP**MASS OF SOFT MATERIAL COMPRISING MAINLY DIGESTIVE ORGANS OF THE GASTROPOD. SEE FIG. 11.

VOLUTION**SEE WHORL

W

WHORLS**"A COMPLETE TURN OR REVOLUTION ROUND THE IMAGINARY AXIS OF A SPIRAL SHELL. THE LAST WHORL IS CALLED THE BODY*WHORL. THE WHORLS ARE DESCRIBED AS NON*CONTIGUOUS, WHEN THEY DO NOT TOUCH EACH OTHER, CONTINUOUS, IN THE OPPOSITE CASE. DEPRESSED WHEN THEY ARE FLAT. THEY ARE ANGULATED, KEELED, OR CORONATED: DISTINCT, OR INDISTINCT. THEY ARE SOMETIMES, AS IN CYPRAEA, HIDDEN BY THE LAST WHORL". (SOW. MAN.). THEY BEGIN AT THE APEX WHORL AND RECKON DOWNWARD TO THE LAST OR BODY WHORL, IN COUNTING WHORLS. SEE FIGS. 102, 55, 56, FIG. 1.

ANGULATED**
CONSTRICTED**PHENACOPTYGMA DALL
CONTINUOUS
CONTINGENT**CLATHRUS
CORONATED
DEPRESSED (FLAT)**FIG. 99
DETACHED (FREE)**CYATHOPOMA, FIG. 100
DISTINCT
DISUNITED**SPIRULA
FEW**
FREE
GLOBOSE**NATICA, FIG. 99
HIDDEN--CYPRAEA
INDISTINCT
KEELED--FIG. 56
NEPIONIC (LARVAL)**VITRINELLA OLDROYDI
OPPRESSED**CONSTRICTED)
RIBBED**FIG. 56
ROUNDED
SHOULDERED **RISSOA ANATINA
SUBULATE**FIG. 99
VENTRICOSE

WIDTH**"IS MEASURED ACROSS THE APERTURE WHICH IS THE WIDEST PART OF THE SHELL". (SOW. MAN.)

Z

ZYGONEURY**USED BY BAKER N HEND. P.298.

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TRYON, G.W.**MANUAL OF CONCHOLOGY 1882 ACAD. OF NAT. SCI. PHIL.

WEBB, GLENN R. THE MATING ANATOMY TECHNIQUE AS APPLIED TO POLYGYRID LAND SANILS.
1947 THE AMER. NATURALIST VOL. LXXXI, P. 134-147

WOLLASTON, TV.***TESTACEA ATLANTICA OR THE LAND AND FRESHWATER SHELLS OF THE AZORES,
MADEIRAS, SALVAGES, CANARIES, CPAE VERDES AND ST. HELENA. L. REEVE & CO., LOND. 1878

WOODWARD**MANUAL OF THE MOLLUSCA 1880 ED.

ZITTEL**TEXTBOOK OF PALEONTOLOGY

THIS IS PROPERLY AN INTRODUCTION, BUT ALSO A CONCLUSION. I WISH TO THANK DR. A MYRA KEEN FOR HER MANY SUGGESTIONS AND CRITICISMS. SHE SUGGESTED AND CONTRIBUTED THE FOREIGN TERMS. NATURALLY THE ENTIRE BURCH FAMILY HELPED WITH SUGGESTIONS AND WITH THE YOUNGER MEMBERS BY KEEPING STILL OR OUT OF MY WAY. I HOPE THIS GLOSSARY WILL HELP THE BEGINNERS IN CONCHOLOGY AND EVEN SERVE TO BE OF SLIGHT AID TO THE OLDER WORKERS IN SHELLS. THE MANY ANATOMICAL TERMS COULDN'T BE AVOIDED. SO MUCH IN FRESHWATER AND LAND SNAIL WORK INVOLVES THESE THAT THEY WERE NECESSARY.

MINUTES 106
DEC. 1950
CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA

SUBSCRIPTION $2.50 per year

We are now meeting the first Tuesday of every month at 7:30 P.M. at the Los Angeles County Museum, Exposition Park, Los Angeles, California. All interested persons are cordially invited.

Please mail all news to your editor,

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1584 W. Vernon Ave.,
Los Angeles 62, Calif.
Telephone Ax 3-5710
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We are sorry that some of our subscribers misunderstood the $1.50 price mark on the Glossary. This was simply to indicate the price of extra copies and for sale to non subscribers. The Glossary is Minutes No. 105 and went to all subscribers as the regular issue last month.

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INTERNATIONAL COMMISSION OF ZOOLOGICAL NOMENCLATURE-

Some very important rulings have been issued recently. These have been reviewed by Dr. A. Myra Keen and our attention called to those bearing on the nomenclature of this coast.

I have just had occasion to do some work with nomenclature of *Acmaea* again and find one change which I am going to recommend as desirable, even though it does burden our memories with one more little item. It is the matter of *A. pelta* versus *A. cassis*. On Mrs. Grant's recommendation we had adopted the former on the ground that of the two synonymous names, the first reviser had selected *A. pelta* and had made *A. cassis* a synonym. However, the International Commission on Zoological Nomenclature, in its 1948 meeting, has reached the conclusion that in such a case page priority and even line priority should take precedence over

A SHORT DISCUSSION OF THE PECTINIDAE

by

Gilbert Grau

The family Pectinidae comprises a large and quite varied group of Pelecypods numbering close to 350 species, of which 47 are found living on the west coast of North America from Alaska to Panama. The distribution in time of this family ranges from the Cretaceous period, 200,000,000 years ago, and possibly from as far back as the Carboniferous period, 400,000,000 years ago. Gastropods were the prevailing type of ancestral mollusk and as Pelecypods evolved, they retrograded in structure with the head disappearing. The mouth and the digestive system were retained, but the mouth serves only as an opening to the stomach and has neither jaws, teeth nor tongue.

There are an enormous number of fossil species of Pectinidae found throughout the world, but since I have, so far, confined my studies and research on the family to the living species only, I shall also confine this talk to those species and their habits.

For purposes of general classification, the Pectinidae are divided into four groups: PECTEN, CHLAMYS, AMUSIUM and HINNITES.

The first group, Pecten sensus strictu, or true Pecten, comprises the species having one flat valve and one moderately to deeply convex. The second, Chlamys, consists of those species in which both valves are of more or less equal convexity. The Amusiums are round, flattish, thin and smooth and have internal ribs only. In Hinnites, the juvenile is identical with Chlamys, but as the animal grows older, it attaches itself to rocks or pilings and the shell becomes quite heavy and distorted.

Incidentally, Pecten, the Latin word for comb, was first applied to scallops by Pliny, a Roman naturalist who lived from 23 to 79 A.D. Chlamys comes from the Greek word meaning mantle, as applied to the garment worn by young men of Ancient Greece. Hinnites stems from the Latin "Hinnus," meaning mule, and I can think of no possible reason for its application to this mollusk, other than the fact that the adult Hinnites (since it is always fixed to a foreign object) is immovable, a common trait of mules. Amusium is the Latin word for compass, and was no doubt suggested by the circular shape of the shell and by the even, radiating internal ribs.

In referring to the foregoing groups of Pectinidae, I have purposely avoided the use of the word genera, since there has been much disagreement among conchologists on this matter and an authoritative revision of the family is badly needed.

As to the physiology of Pectinidae, I must say first that I am not a biologist, but I can present to you some of the knowledge I have gained from a number of books on the subject.

The organs of particular interest are the adductor muscle, the mantle, the eyes and the foot. In the early growth stages, the foot is used for locomotion, but its main function is the spinning of the byssus, fine threads of mucous substance with which the animal attaches itself to seaweed, eelgrass and other objects. Inside the foot is the byssal gland which secretes this substance and on the side of the foot there is a fine groove through which the substance is ejected and spun into a thread. Attachment is common among juvenile scallops but, with few exceptions, not among adults.

The adductor muscle is large and strong and situated near the middle and to one side of the shell. It is composed of two unequal parts. The larger part is the motor muscle which snaps the valves together when swimming. The smaller part functions to hold the shell closed or in any partially closed position. As is generally known, it is the adductor muscle which is taken from many of the larger Pectinidae in all parts of the world and used for food. In other words, what we get when we buy scallops.

The mantle consists of two lobes of flesh which line the valves at the margin starting below the hinge line on either side and nearly surrounding the internal organs. These lobes are composed, at their outer edge, of three folds. The outer one, the shell fold, is small and bears long tentacles. The middle fold is rather small and bears tentacles and the eyes. The inner fold is the largest and is turned inward to form a flap. This fold also contains a strong ligament, the function of which will be described later, as will the secretion of the shell by the mantle.

As to the eyes, they have been the subject of much conjecture but not enough study, and there is considerable disagreement among various authorities as to their function and capabilities. Although they are composed of cornea, iris, lens, retina and optic nerve, it has never been established that they can actually see, but only that they are sensitive to light. Oddly enough, they react most positively to decrease in illumination or to shadows. Among various species of Pectinidae, the number of eyes varies from 60 to 130 and in all cases, the upper or left valve has the largest number.

In regard to reproduction, both unisexual and hermaphroditic species of Pectinidae exist. P. grandis, the commercial scallop of the Atlantic coast is unisexual, for example, while P. maximus and P. opercularis of Europe are hermaphroditic. Spawning takes place in the late summer and fall of the year and maturity is reached within a year of birth. The life span of the average Pectin is about two years.

The ability to swim is a function which distinguishes the Pectinidae from all other mollusks, except their relatives, the Limidae. This function is highly developed and exceedingly interesting to observe and may well be called one of the earliest examples of jet propulsion. When the animal is resting on the bottom, or is attached to any foreign object, both valves are open slightly; the right valve always being on the bottom. The edges of the upper and lower inner folds of the mantle are just barely touching each other.

To execute the typical swimming movement, the adductor muscle snaps the shell shut. At the same time, the inner folds of the mantle are brought together to form a wall or curtain and water is then forced out through the byssal sinus and the posterior sinus, that is, the gaps on either side of the shell just below the hinge. As these jets of water are forced out in the direction of the hinge, the animal naturally is propelled in the other direction, with the free edge of the shell foremost.

Opening the shell again is accomplished by the expansion of the internal ligament, which is a wedge-shaped piece of tough cartilage embedded in and fastened to triangular pits situated at the center of the hinge line of each valve. The shell is now open again and water has entered between the valves, so the adductor muscle snaps them shut and the animal is again propelled forward. Each time water is admitted between the valves, the animal sinks slightly, which accounts for the rather jerky and somewhat zigzag progress of the animal through the water.

When it is necessary to swim in the opposite direction, the mantle folds are drawn in against the shell so that water is expelled between them and the animal is propelled in reverse, with the hinge-line foremost. It is also possible to force the water out through just one side of the hinge-line, resulting in a sidewise motion.

Occasionally, the action of waves will turn a scallop over onto its left valve. In this case, the animal simply draws the mantle of the right valve, which is now on top, over that of the left, leaving a space between. Water expelled through this space flips the animal over onto its right valve again.

And now for the shell of Pectinidae. There are, of course, two valves which are symmetrical although not always of equal size or convexity. They are fastened together by the external ligament which extends the length of the hinge-line. Each valve has three layers. The pearly inner layer is secreted or produced by the whole mantle, but the middle and outer layers are secreted by only the outer edge of the mantle. The thickness and size of various specimens varies with age and with the temperature, depth and salinity of the water.

In the first growth stages of the shell, there is no byssal notch, no ears and no ribs. In the next stage, the byssal notch develops and soon after that, the ears appear and ribs begin to form, starting at the outer margin of the shell.

The ribs serve two purposes. First, they make it possible for the shell to be light in weight but strong. Second, since the ribs of each valve fit into the spaces between the ribs of the opposite valve, they insure a tight and rigidly fixed closing of the valves when that is desired. The number of ribs in any given species is quite variable and cannot be used as an accurate guide in classification. For example, in a colony of P. opercularis at Eddystone, England, specimens were taken having from 14 to 22 ribs.

The form and sculpture of the shell are often closely connected with the conditions under which various species live. Most deep-water forms are small, thin and translucent, with little or no ribbing. The absence of ribs is explained by the fact that wave motion is at a minimum in extreme depths. Most of the larger and heavier species live close to the shore where wave motion is rougher and strength of shell is consequently more important.

A number of the heavily-spined or scaly-shelled species are found embedded in sponge and the function of the scales is obvious. Our local Hinnites giganteus, since it is fastened to rocks or pilings and therefore subject to much pounding or waves, has a strong heavy shell plus the faculty of developing the shell to fit into any crevice in the rocks or pilings, with the result that no two specimens can be found which are identical in form.

An Indo-Pacific species, P. madreporarum, which is small and thin, settles in the juvenile stage among branches of coral and as it grows is trapped there. Consequently, most adult specimens of this species are distorted.

Apart from such special cases as the foregoing, most Pectens, as nearly as I have been able to determine, are found living on the ocean floor, unattached to foreign objects and in colonies of from dozens to hundreds and even thousands of specimens.

The classification and nomenclature of Pectinidae is a tremendous problem, and the one with which I am most concerned. The first use of the name Pecten, under the binomial system, was by a German conchologist, Otto Muller in 1776 and his first species was Pecten maximus Linne. Therefore, we recognize P. maximus as the type of Pecten.

At present, the safest procedure seems to be that of classifying all Pectinidae under the generic designation Pecten and to follow that with the sub-generic and specific names. Pending a thorough revision of the family, this would seem to be the least troublesome method.

In regard to both genera and species, the present state of confusion among the Pectinidae is the result, not only of the usual problems of priority of nomenclature, many of which have not been satisfactorily resolved, but also the result of the conflict of two opposing schools of thought: one drawing strict geographical boundaries and the other not.

To illustrate what I believe to be the invalidity of the strict geographical approach, the species P. pallium is found throughout the South and Central Pacific, Japan, the Philippines, northeast and north Australia, the East Indies and the Indian Ocean. And in specimens from all of this vast area, the shells show only slight variations in form and color.

Since P. pallium is found in a 12,000 mile range east to west and 5,000 miles north to south, the general adoption of the observance of strict geographical boundaries would result in a number of new species and perhaps several new genera.

While my interest in general semantics has made me wary of extremes and generalizations and I should like to be regarded as neither a "lumper" nor a "splitter," still I feel that we have more than enough generic and specific names to be used in dealing with the known species of Pectinidae.

Incidentally, an even more striking example of wide geographical distribution is found in the species P. vitreus Gmelin. It has been taken in European waters from the Arctic to the Mediterranean, on the east coast of North America from Nova Scotia to Chesapeake Bay, and at Patagonia, the Philippine Islands and Japan. In my collection, I have specimens from Norway, Massachusetts and Japan which show no difference whatsoever in form or sculpture.

The synonymy of species is an enormous problem when dealing with Pectens and considerably more confusion exists in this family than in most others. Only by a great deal of study and research on the family can we hope to resolve these problems and by continuing my work on Pectens, I hope, in time, to make at least a small contribution in this direction.

The major difficulty in studying the Pecten family is that of securing specimens, because, while some species are found in shallow water, a great many live in moderate to extreme depths and collecting them is impossible unless dredging equipment is available. The greatest depth at which I have been able to find a record of Pectens being taken is 1813 fathoms, the species being P. (Cyclopecten) dilectus Verrill and Bush, and the locality off Martha's Vineyard, Massachusetts.

In regard to my interest in mollusks in general and Pectinidae in particular, I must first express my gratitude to John Burch. Without his generous assistance and guidance, I would never have become seriously interested in conchology, and the benefit of his wide knowledge in this field has been of immeasurable help.

Leo Hertlein, of the California Academy of Sciences, who has done a great deal of important work on the Pectinidae has kindly given me much invaluable assistance in problems of both identification and classification. At present, my collection of Pectinidae contains 231 species and subspecies. In all species, I have tried to assemble first a growth series, ranging from the smallest juvenile obtainable to the typical adult; second, a series of adult specimens showing variations of form and color, and third, a series of specimens from different localities. So far, I have been fortunate enough to secure, for example, more or less complete growth series in over 60 species.

By means of an enormous amount of correspondence, I have managed to consummate many pleasant and valuable exchanges with both private collectors and museums throughout the world. Museums have been particularly kind in helping me with Pectens, and since many museum specimens are the result of organized scientific expeditions, I have been able to secure a great deal of material which only a museum could supply.

As an example of this, through the generosity of Dr. A. W. B. Powell of the Auckland Museum, New Zealand, I now have in my collection all of the Pectens native to New Zealand, including one species of which there are only four known specimens.

I am specializing in Pectinidae for three reasons. First, I hope in time to acquire sufficient knowledge to prepare at least a preliminary revision of the family. Second, the family consists of many beautiful,colorful and interesting species and it is always a pleasure to work with my specimens, and a thrill to receive new additions to the collection. Third, whenever my life span runs out, my collection will go to a museum (un-named as yet) and will serve as an excellent basis for further work by future conchologists.

In conclusion, I must admit that this talk has been perhaps a bit wordy, although a much more detailed discussion of the Pectinidae could be made. Such a discussion, however, I feel would only be of interest to collectors specializing in the family.

I sincerely hope you have not found the foregoing too dull, and for your time and your attention, thank you.

decisions of revisers. (Bull. I.C.Z.N., vol. 4, p. 328, 1950). Hence, we should abandon *A. pelta* in favor of *A. cassis.* This is the more desirable procedure, I think, because the latter is well figured by Eschscholtz, whereas *A. pelta* was merely described. The type locality of both is Sitka. Mrs. Oldroyd copied both descriptions but her figures of *A. cassis* were from Tryon. I have a photographic copy of the original figure if you wish to see it.

Decisions relating to taxonomy of West American mollusks as reported in the Bulletin of Zo logical Nomenclature, vol.4,1950

p. 147: Clarification of previous rulings on emendations of generic names:.." if a generic name which had been invalidly emended was later rejected as an invalid homonym, the invalid emendation of that name becomes an available name for the genus concerned, as from the date on which it was originally published."

This means that the first available generic name for the species known to us as *Purpura foliata* and *P. nuttalli* is *Ceratostoma*, not *Pterorytis*.

The story on this name is: *Cerostoma* Conrad,1837 is a homonym. The type (monotypy) is *Murex (Cerostoma) nuttalli.* Hermannsen, Dec.,1846 (Indicis Generum Malacozoorum, vol.1, p. 206), not having seen Conrad's paper copied the name from a review as *Cerastoma* but stated, " Rectius *Ceratostoma* vel *Cerostoma*". Since the original was *Cerostoma*, preoccupied, and *Cerastoma* had been used in Arachnida by Koch,1839 (and was a typographical error anyway, not an emendation), we have *Ceratostoma* as a legitimate emendation. It conforms to the conditions outlined above as being an invalid emendation (that is, it was not made because of a proved typographic error or lapsus calami on the part of the original author, Conrad, but was made only to satisfy Hermannsen's sense of good orthography). It automatically takes the same type as *Cerastoma* and is a synonym of the latter unless and until that name can be proved to be nomenclaturally unavailable. Since *Cerostoma* is now known to be preoccupied and *Ceratostoma* as a word differs from it sufficiently to be valid under the Rules, we must, as I see it, adopt *Ceratostoma* to replace *Purpura* , which is now dated from Bruguiere by Clench and others and applied to a different biologic group and *Pterorytis* , which both Dr. Woodring and I had previously considered to be the first available synonym.

p. 301: The type of *Aplysia* Linne,1767 is fixed as *A. depilans* Gmelin, 1791.
The type of *Tethys* Linne,1767 , is fixed as *T. fimbria* Linne, 1767.

p. 304: The type of *Venus* is fixed as *Venus verrucosa* Linne,1758

p. 305: The type of *Bulla* is fixed as *Bulla ampulla* Linnaeus,1758 Hence, we drop *Vesica* and shift back to the old concept.

p. 310: The type of *Tonna* is *Buccinum galea* Linnaeus,1758. Hence, *Tonna* officially supersedes *Dolium*.

(con.)

p.389: *Acmaea* Eschscholtz is not a homonym of *Acmea* Hartmann. The question of *Acmea* versus *Truncatella* is left open with the tacit suggestion that someone petition to have the latter officially protected.

p. 328: First reviser rule repealed- see letter at beginning.

p. 417: The type of *Erycina* is *E. pellucida* Lamarck,1805.

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Mitra orcutti Dall

When we covered the Mitridae in our discussions (Minutes 49, pp 29-34) we made the statement " It is possible that this species may be identical with the above mentioned *M. solitaria*. In any event it must be exceedingly rare., no member of the club having reported even seeing a specimen."

It was therefore with great interest that we received the following letter from Dr. A. Myra Keen: " I forgot to tell you in my last letter that I believe I have *Mitra orcutti* Dall. This fall I at last got around to identifying the small stuff I collected in San Diego in 1936, and one specimen fits Dall's description of the species very well, at least to my eyes. In the Minutes you stated that no member had ever reported it. If you would like to check me on this and perhaps display it at the next Conchological Club meeting, I'll send it down. It is a pretty little red-and-white banded shell. It was not taken alive unfortunately, but came among the rubble I dug out of some potholes below our cottage on Ocean Beach at low tide."

Letter of Oct. 30-" I am sending the supposed *Mitra orcutti* to you for study and exhibit at the next meeting (if you concur with me on the determination). At first I thought it was a *Mitramorpha*, but if it is it doesn't compare with any we have, and the columellar folds are too strong. Except that it is banded instead of splotched, it seems to fit Dall's description of *M. orcutti* perfectly. I'll be interested in your decision."

We had the specimen at the meeting and all of us studied it under a glass. Our conclusion was that if it is not *Mitra orcutti* , it is a species unknown to us. We are disposed to agree with Dr. Keens opinion.

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* Note* The opinion of the International Commission p 305 reviewed above by Dr. Keen obviously changes my conclusion reached in my talk before the club at the November meeting. The official recognition of the type of *Bulla* as *B. ampulla* and not *B. naucum* changes the entire concept. We must abandon *Vesica* and return to our time honored *Bulla gouldiana* etc., and at the same time return to *Atys naucum*(Linnaeus). This will obviously mean that the following species must be written *Atys esteroensis* (J.Q. Burch).

THE VALUE OF PRE-LINNEAN WORKS ON CONCHOLOGY

(Abstract of a talk by John Q. Burch at the November meeting)

An attempt to even outline the use of books in zoological research would be too large a subject to attempt in one lecture. Therefore, this evening the discussion will be confined to the use of pre-Linnean authors. If the club finds this of interest, we could take up other problems later.

"It is well known that our system of binomial nomenclature in universal use in all branches of natural science, was established by Linnaeus, and that Systema Naturae forms the foundation upon which all subsequent work rests. The multitudinous works of Linnaeus were very difficult to collate prior to the publication in 1933 of the Catalogue of the Works of Linnaeus by the British Museum. A copy of this valuable book will be exhibit A.

A copy of the tenth edition,1758 is on the table, as well as a copy of Gmelin's edition,1777. These are but two of many.

A perusal of these will make it obvious that all knowledge of nature as of 1758 did not spring from the brain of Linnaeus, but that he simply established a system of nomenclature to incorporate the work of countless generations of scholars throughout the centuries.

Linnaeus did not designate types nor in many cases ever see or know the actual species he listed. The references below his species are to older works. The thorough student, therefore, when working on the taxonomy of a Linnean species, is obliged to examine these older books. It is true that the actual nomenclature of these older non-binomial authors is not acceptable, but the figures and discussion are, in fact, the only way by which it can be determined exactly what shell Linnaeus had in mind.

Perhaps I should take up a less complicated matter than the genus *Bulla* for an illustration, but, as you know, we have had a great deal of confusion regarding this name.

In the first place check Systema Naturae page 726 and note under *Bulla* the species *naucum*. Under this Linnaeus refers to Rumphius. muf. t. 27, f.h: Gualtieri, t.13, f.GG: D'Argenville t.20,f.Q. These three pre-Linnean works are on the table showing the figures referred to. It is obvious that the figures are of the species known in recent years as *Atys naucum*. The species I described as *Bulla esteroensis* is certainly in the same genus with *naucum*.

The source of some misunderstanding may be seen by referring back to page 427 where Linnaeus uses the name *Bulla* not as a genus but as a subgenus of *Gryllus*, a cricket. Some authors concluded that this usage made the name *Bulla* " stillborn" as a molluscan name.
However, you will recall the excellent lecture by Dr. W.O. Gregg at a recent meeting regarding the opinions of the International Commission of Zoological Nomenclature. This problem has been passed upon in Opinion 124, issued October 28th,1936.
124. Linnaeus, 1758a Subdivisions of Genera.- " The various subdivisions of genera published by Linnaeus in 1758 are not to be accepted as of this date (1758) as of subgeneric value under the International Rules". The Commission adds: " The adoption of this automatically settles the use of *Bulla* now before the commission, i.e. the alleged *Bulla* Linn,1758, Insect is not a subgenus under this opinion and therefore does not affect in any way the standing of *Bulla* Linne,1758 (a) Mollusk."

A few other books on the table are frequently cited by Linnaeus- Swammerdamm: Bibel der Natur 1752; Klein 1734; Museum Gottwaldianum.

Those interested will probably find figures of almost all of the Linnean species in the books now on the table.

In conclusion, I wish to comment upon an error frequently found in the minds of younger conchologists. It is the inference that work prior to Linnaeus was of little importance. This is a great slander against the vast host of brilliant scholars who studied nature for hundreds of generations before Linnaeus and the information they obtained was passed down through the centuries only to finally be organized into a workable scheme of nomenclature by Linnaeus.

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Rev. H.B. Herrington of Keene, Ontario, Canada - writing from London, England. "Dear Mr. Burch: In the interest of conchology I thought you might be interested in hearing that I have been spending a month in the British Museum (Natural History) studying their Sphaeridae.

Mr. A.W. Stelfox of Dublin, Eire very kindly offered me his collection of Pisidium if I would come over and spend a week with him and pick it. As I could not get passage back for some time I arranged to put in that time studying the Sphaeridae. I sail for Canada on Nov. 7th after a very pleasant seven weeks in Eire and England.

Theree is nothing of special interest to report unless it be that I have found Sphaerium tenue Prime, here. It was known on the continent as S. nitidum Clessin, but in the British Isles it passed as a form of S. corneum (Linne).

The fossil Pisidium which B.B. Woodward described as P. vincentianum was also known since then to be still living in the east.

I have also run across two lots of Recent specimens here - one from Persia and one from Turkestan. It is rare."

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NEW PUBLICATION RECEIVED

Johnsonia, Vol. 2, No. 29, Sept. 30,1950

The Genera Sthenorhytis, Cirsostrema, Acirsa, Opalia, and Amaea in the Western Atlantic.

I AM PLEASED THAT DR. CLENCH IN JONSONIA JUST RECEIVED, IS GIVING GENERIC STANDING TO THE GROUPS HERETOFORE CONSIDERED SUB GENERA OF THE GENUS EPITONIUM. TO THE AMATEUR COLLECTOR THESE NAMES SEEM TO BE MERELY A GREAT NUISANCE, BUT TO THE SERIOUS WORKER THEY ARE WELCOME. THE REASON FOR THIS IS THAT THE FIRST THING TO BE DONE IN WORKING UP A MIXED LOT OF THIS FAMILY IS TO SEPARATE THEM INTO THESE SAME GROUPS WHETHER YOU CALL THEM GENERA OR SUBGENERA. IT IS VIRTUALLY IMPOSSIBLE TO MAKE A START UNTIL THIS IS DONE. ALL OF YOUR KEYS AND DESCRIPTIONS ARE SO ARRANGED.

AND AS I HAVE HAD OCCASION TO DO, YOU WISH TO COMPARE YOUR SPECIMENS WITH THOSE IN ANOTHER LARGE COLLECTION, AND YOU FIND THIS COLLECTION WITH THE SETS LABELLED EPITONIUM FOR EXAMPLE AND ALL ALPHABETICALLY ARRANGED BY SPECIES WHICH SEEMS TO BE A COMMON PRACTICE, IT BECOMES NECESSARY FOR YOU TO RE ARRANGE THE ENTIRE CABINET DIVIDING THEM INTO THEIR PROPER GROUPS BEFORE YOU CAN INTELLIGENTLY WORK WITH THEM. AND THEN, OF COURSE, IF THE COLLECTION IS NOT YOUR OWN YOU FEEL THAT YOU MUST REARRANGE THEM IN THE ALPHABETICAL OR NUMERICAL ORDER IN WHICH YOU FOUND THEM.

I KNOW THAT THIS IS A MOOTED QUESTION BUT FOR ONE I AM ENTIRELY IN ACCORD WITH THE CURRENT POLICY OF GIVING ALL EASILY SEPARABLE GROUPS A GENERIC NAME.

WE HAVE THESE GENERA ON OUR OWN COAST, STHENORYTIS, OPALIA, CIRSCTREMA, ETC.

* * * * * *

NOTESON THE HISTORY OF NEMOCARDIUM (FAMILY CARDIIDAE) - JOURNAL DE CONCHYLIOLOGIE, VOL. XC, 1950

DR. KEEN HAS SPECIALIZED ON THE FAMILY CARDIIDAE. THIS IS A VERY SCHOLARLY PAPER THAT WILL BE A NECESSITY FOR ANY STUDENT OF THIS FAMILY.

THE NAUTILUS - VOL. 64, NO. 2, OCTOBER, 1950

THE FOLLOWING ARTICLES APPEAR WITH THE CUSTOMARY EXCELLENCE OF ALL PAPERS APPEARING IN THE NAUTILUS.

NEW FOUNTAIN SNAILS FROM FLORIDA BY H. A. PILSBRY
TETHYS (APLYSIA) WILLCOXI IN RHODE ISLAND WATERS BY DONALD J. ZINN
STUDIES ON MOLLUSK POPULATIONS BY R. STOHLER
HOLOSPIRA KRIEGERI, NEW SPECIES FROM TAMAULIPAS BY ROBERT J. DRAKE
LAND SNAILS FROM CLIFTY STATE PARK AND VERSAILLES STATE PARK, INDIANA BY CLINTON J. BUSHEY
PSEUDOSUBULINA, A GENUS NEW TO THE UNITED STATES BY H. A. PILSBRY
NOTES ON LAND SNAILS OF TEXAS BY H. A. PILSBRY
SOME NEW RECORDS FOR EXOTIC SLUGS IN THE U.S. BY C. BRUCE LEE
NEW MEXICAN AND PANAMIC SHELLS BY MAXWELL SMITH
DANIEL LITTLEFIELD EMERY BY W. G. FARGO
OLOF O. NYLANDER BY PERCY E. RAYMOND
AMERICAN MALACOLOGICAL UNION: 16TH ANNUAL MEETING BY M. C. TESKEY

CATALOGO MOLUSCOS DE CUBA - C. G. AGUAYO Y M. L. JAUME , APRIL 1950, NO. 671 AND 681.

THIS INVALUABLE WORK CONTINUES FROM 671 TO 700 INCLUSIVE. ALL PERSONS CONCERNED IN ANY WAY WITH THE FAUNA OF THE WEST INDIES WHO ARE NOT NOW IN POSSESSION OF THIS WORK SHOULD IMMEDIATELY WRITE FOR IT TO DR. M. L. JAUME, 13 NO. 351, VEDADO, HABANA, CUBA.

ENTOMOLOGIA CUBANA - M. L. JAUME , DICIEMBRE 10, 1947, NO. 201.

THIS IS A BIT OUT OF LINE FOR CONCHOLOGISTS BUT THE SAME AUTHORS ARE ISSUING THE ABOVE WORK WHICH IS AS VALUABLE TO ENTOMOLOGISTS AS THE CONCHOLOGICAL WORK IS TO CONCHOLOGISTS.

CIRCULARES DEL MUSEO Y BIBLIOTHECA - DE MALACOLOGICA DE LA HABANA - PP. 351 TO 410.

PERSONS OR INSTITUTIONS SHOULD NOT OVERLOOK THESE EXCELLENT PAPERS. IT IS TRUE THAT MOST OF THEM ARE IN SPANISH, BUT THEY AMOUNT TO AN INTERNATIONAL NEWS OF ALL AFFAIRS OF INTEREST TO CONCHOLOGISTS. THE CHARGE IS BUT $1.50 PER 100 PPS. THIS SHOULD BE REMITTED TO M. L. JAUME, 13 NO. 351, VEDADO, HABANA, CUBA.

HOWEVER, IT IS A SLANDER TO STATE THAT THE CIRCULARES ARE A MERE RECORD OF EVENTS AND PERSONALIA. THEY COVER MANY PAPERS OF PERMANENT VALUE. FOR EXAMPLE THIS ISSUE CONTAINS - "DATOS SOBRE LA RESISTENCIS AL CALOR......BY DR. P. H. FISCHER.

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MINUTES - NOVEMBER - 1950

MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA - NOVEMBER, 1950

THE PRESIDENT, MR. GEORGE KANAKOFF CALLED THE MEETING TO ORDER AT 7:30 P.M., NOVEMBER 7TH, 1950, AND WELCOMED 21 MEMBERS AND INTRODUCED GUESTS.

MR. KANAKOFF ANNOUNCED THE MEMBERS OF THE NOMINATION COMMITTEE AS FOLLOWS:

CHAIRMAN - DR. GREGG
MR. BURCH MR. SCHICK

THIS COMMITTEE IS TO GIVE ITS REPORT AT THE DECEMBER MEETING. ELECTION OF OFFICERS IS ALSO TO TAKE PLACE AT THE DECEMBER MEETING.

JOHN Q. BURCH SPOKE OF THE LAST JOHNSONIA RECEIVED AND EXHIBITED A SPECIMEN OF MITRA ORCUTTI DALL - COURTESY OF DR. A. MYRA KEEN. (MORE TO BE FOUND IN THE "MINUTES").

DR. HOWARD SPOKE OF THE DISTRIBUTION OF CYRILLA MINUTA AND CYRILLA SP.

ALL WERE SADDENED AT THE NEWS OF CAPTAIN ARTHUR HASS' PASSING.

A LETTER WAS RECEIVED FROM MRS. EFFIE CLARE AND SHE EXTENDED HER GREETINGS TO ALL.

JOHN Q. BURCH GAVE AN INTERESTING PAPER ON PRE LINNIEAN NOMENCLATURE AND AUTHORS, AND EXHIBITED MANY RARE BOOKS. HIS PAPER WILL APPEAR IN THE DECEMBER ISSUE OF THE MINUTES.

IT WAS VOTED TO CONTINUE POT LUCK DINNERS. THE SOCIAL HOUR WAS HEARTILY ENJOYED.

THE MEETING WAS ADJOURNED TO INSPECT THE RARE BOOKS THAT WERE DISPLAYED BY JOHN BURCH.

MRS. JOHN Q. BURCH, SECRETARY

MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA - December 1950

The President, Mr. George Kanakoff, called the meeting to order at 7:40 P.M. Tuesday, December 5th., 1950, in the Educational Departmeny of the L.A.C.M. Twenty-seven members and guests were welcomed.

The Secretary gave the following report for 1950:

Twelve regular program meetings with an average attendance of 26½ persons.
Seventeen papers were given by members. One by Mr. John E. Fitch of the California fish and game. Subject: "Tivila". One - courtesy of Standard Oil of California "Marine Oddities."
Nine pot luck suppers were enjoyed.

President, Dick Mayhew, of the LOST OPURCULAM CLUB created a great deal of interest among members and friends. Persons responded.

Three field trips were planned and well attended.

1949 Balance	$ 6.80
Dues - 1950	13.00
	$ 19.80
Exp. - Notices & Sup.	11.06
December Balance	8.74

HONORARY MEMBERS

Dr. H. A. Pilsbry	- 1942	Mr. A. M. Strong	- 1949
Mrs. Effie Clark	- 1943		

1950 - Regular Members
1949 - " "
1948 - " "
1947 - " "

1947 (New members - 17)
1941 " " 9
1937
1935

The officers of 1950 - same as 1949 except Secretary.

Pres.	George Kanakoff
Vice-President	Dick Mayhew
Secretary-Treas.	Mrs. John Q. Burch

The report of the Secretary was accepted.

Dr. Gregg, Chairman of Nomination Committee, read the following report.

Pres.	Mrs. John Q. Burch
Vice Pres.	Mr. Morris Cranthers
Sec.-Treas.	Mrs. E. P. Chace.

It was moved by Mr. Reese that the nomination committee report be accepted, and nominations be closed and the nominees be unanimously elected. This motion was seconded and their being no objections the above nominees were declared elected.

Mrs. Burch thanked the members for the honor and privilege to serve as their President.

Mrs. Chace announced she would be unable to send out monthly notices.

The Secretary, Mrs. John Q. Burch, called attention to Article XI, Section 4:

Honorary members shall be persons ineligible to active membership, who have contributed valuable aid to the study of conchology, and particularly those who have aided in the study of West Coast shells. Not more than one person can be elected to honorary membership during one club year.

It was moved by Mrs. E.P. Chace and seconded by Dr. Gregg that Dr. A. Myra Keen be elected to honorary membership of C.C.S.C. for outstanding work. The motion was unanimously carried.

Several Nomenclature reports were given, and the work done on the Glossary by Beatrice L. Burch was commended very highly.

Dr. Howard spoke again on Julia Lineata Sp. Nov., and showed interesting photographs of same.

Mr. & Mrs. Joseph W. Libley, formerly of Long Beach, but now residing at 7563 McConnell Avenue, Los Angeles, asked to become regular members. They were heartily welcomed.

After exchanging Christmas shells the meeting adjourned to enjoy cake and "coffee."

Mrs. John Q. Burch - Secretary
4206 Halldale Avenue Phone: AX 2-7965
Los Angeles 62, California AX 3-5710

January 2nd, 1951, Meeting - Pot Luck at 6:30 P.M. Program at 7:30 P.M.

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NEWS ITEMS

Capt. A. Haas, 74, died October 23rd, 1950. He retired with a captain's rating from the Coast Artillery after serving in World I. He has resided in St. Petersburg, Florida for the past ten years after his retirement as a Mathematic rofessor. He was a very active member of the St. Petersburg Shell Club and it was through his untiring efforts that they were able to put on their National Shell Shows. His contributions to Conchology were many and his loss is felt by all.

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Margaret Teskey, Secretary, Conchological Section, Buffalo Society of Natural Sciences sends greetings to all from the Buffalo club. She announced that the 1951 convention of the A.M.U. is to be held in Buffalo and they are making big plans and would love to have everyone attend.

Reports disclosed that collecting was done in Texas, Virginia, Florida and Canada as well as in the Buffalo area, and some outstanding discoveries were made. Miss Teskey found Arion intermedius living in the Boston Hills, happily unaware that never before has this specie been reported east of California.

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In one of the last frontiers for exploration--the ocean depths--scientists of the University of California and the U.S. Navy have discovered a vast range of mountains. Although hidden forever from all observation except by recently developed instruments, the mountain chain is physically and geologically as mighty as the Sierra Nevada. Its mud-covered slopes have yielded organisms suspected of being the oldest living things in the world. The range has been named the Mid-Pacific Mountains.

Normally it was explained bacteria are concentrated only in the first few inches of ocean mud, where nourishment exists. But in these cores, bacteria were found in equal number to depths of 20 feet. Dr. Revelle suggested that the organisms must have remained there in a state of half frozen suspended animation for millions of years and thus may be the oldest life on earth for the bacteria became vigorous and active again when placed in culture media on shipboard.

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Ancient archeological discovery said to be not only of great scientific interest but of practical value to two of California's major industries has been claimed by a southside resident and explorer. He is S. Maus Purple, consulting engineer and member of the American Association for Advancement of Science.

Purple reported explorations leading to the finding of pantozoic shell marble about 100 million years old and containing evidences of human and animal life. The massive pantozoic deposit with 1 million tons of shell marble boulders weighing 50 pounds to 1000 tons extends seven miles in Coyote Mountain and represents one of the earliest geologic periods, Lower Miocene, which was forming when the Gulf of California covered Imperial County and Coachella Valley above Indio.

More than 50 species of ancient mollusks have been identified including giant clams, giant oysters and mammoth sharks. The matrix of intercellular designs of the trillion shells in the deposit will permit polishing of the marble material for eventual use in building and similar industries.

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